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U.S. Department of the Interior
Bureau of Land Management

Medford District Office
3040 Biddle Road
Medford, Oregon 97504

May 2002

Cascade-Siskiyou National Monument

Draft Resource Management Plan/Environmental Impact Statement

Volume 1 - Main Text

2004-C12086/NF C

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interest of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

BLM/OR/WA/PL-01/017+1792

Public Disclosure Notice: Comments, including the names and addresses of respondents, will be available for public review at the Bureau of Land Management office address listed on the front cover of this document, during regular business hours, Monday through Friday, except holidays. Individual respondents may request confidentiality. If you wish to withhold your name or street address from public review or from disclosure under the Freedom of Information Act, you must state this prominently at the beginning of your written comment(s). Such requests will be honored to the extent allowed by law and recent court decisions. All submissions from organizations, businesses, or individuals identifying themselves as representatives or officials of organizations or businesses, will be made available for public inspection in their entirety.

I

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
MEDFORD DISTRICT OFFICE
3040 Biddle Road
Medford, Oregon 97504
email address: or110mb@or.blm.gov

IN REPLY REFER TO

6240(114)
CSNM Study Plan
A6778(TH:jl)

Dear Reader:

This Draft Resource Management Plan/Draft Environmental Impact Statement (DRMP/DEIS) for the Cascade-Siskiyou National Monument (CSNM) proposes and analyzes alternatives for long-term management of the Monument. We have made every effort to disclose and discuss important perspectives on the environmental impacts of the alternatives including the preferred alternative. On June 9, 2000, the Cascade-Siskiyou National Monument was established by Presidential Proclamation 7318. In this Proclamation, the BLM was directed to complete a resource management plan. This DRMP/DEIS is the initial effort of completing the resource management plan for the Cascade-Siskiyou National Monument.

We welcome your comments on the contents of this document. We are particularly interested in comments that address one or more of the following: (1) new information that would affect the analysis; (2) possible improvements in the analysis; and (3) suggestions for improving or clarifying the proposed management direction. Specific comments are most useful. BLM will respond to comments addressing the adequacy of the DRMP/DEIS in the Proposed Resource Management Plan/Final Environmental Impact Statement. This CSNM DRMP/DEIS will also be published on the Medford District's web site, **www.or.blm.gov/csnm**, under "Draft Resource Management Plan."

There are four resource management alternatives proposed in this DRMP/DEIS. All public comments received prior to April 2002 were considered in identifying and addressing issues during the development of alternatives for managing the Monument. Also considered was information supplied by tribes, State and local governments, other federal agencies and data developed by BLM staff. The alternatives were designed to provide different management activities that protect, maintain, restore and/or enhance Monument objects, resources, and ecological processes while providing opportunities to the public to enjoy this unique southwest Oregon landscape. In compliance with Code of Federal Regulations (CFR) § 1610.4-7, Alternative C was identified as the preferred alternative. Although a preferred alternative is identified, it is recognized that parts of the other alternatives would also meet management goals or possibly new information will be identified and, as a result, dialogue and comments received on this draft plan will be heavily relied upon in the formulation of the Proposed Management Plan/Final Environmental Impact Statement. In accordance with BLM Planning Regulations, 43 CFR 1610.2(e), ninety (90) days shall be provided for review of the draft plan and draft environmental impact statement. The 90-day period shall formally begin when the Environmental Protection Agency publishes a notice of filing of the draft environmental impact statement in the *Federal Register*. In order to be considered for the Proposed Resource Management Plan/Final Environmental Impact Statement, written comments must be received within formal comment period. **Written comments will be accepted on this CSNM DRMP/DEIS until September 20, 2002.**

Comments, including names and street addresses of respondents will be available for public review at the Medford District Office; 3040 Biddle Road, Medford, Oregon during regular business hours (8:00 a.m. to 4:30 p.m.) Monday through Friday, except holidays. Individual respondents may request confidentiality. If you wish to withhold your name or address from public review or from disclosure under the Freedom of Information Act, you must state this prominently at the beginning of your comments. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will be made available for public inspection in their entirety.

BLM will discuss the various management alternatives and answer questions pertaining to the Monument in public meetings. Meeting locations, dates and times will be published in the Medford and Ashland newspapers and on the BLM Medford District's web site, **www.or.blm.gov/csnm** under "Public Meetings."

Please keep this copy of the CSNM DRMP/DEIS as information provided may be referred to, but not reprinted, in the Proposed Resource Management Plan/Final Environmental Impact Statement.

Written comments pertaining to the CSNM DRMP/DEIS should be sent to:

Ted Hass, CSNM Team Leader
3040 Biddle Road
Medford, OR 97504

or comments may be e-mailed to Ted_Hass@or.blm.gov

Sincerely,

Richard J. Drehobl
Monument Manager
Cascade-Siskiyou National Monument

Sincerely,

Ron Wenker
District Manager
BLM Medford District

CASCADE-SISKIYOU NATIONAL MONUMENT DRAFT RESOURCE MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT

Cascade-Siskiyou National Monument Acting Manager Recommendation
I recommend the proposed draft plan and environmental impact statement (EIS) for the Cascade-Siskiyou National Monument be published for interagency and public review and comment as required by 43 Code of Federal Regulations (CFR) 1610.2. The draft EIS considers all issues raised during plan scoping that are within the decision space allowed by the Executive Order which proclaimed the Monument designation and other non-discretionary programs and policies. The alternatives defer proposing land use allocations or management directions that are precluded by the need for the livestock grazing study required by the Proclamation. The action alternatives were prepared in accordance with applicable planning procedures and are designed to protect, maintain, restore or enhance Monument objects, resources and processes while providing opportunities to the public to enjoy this unique southwest Oregon landscape.

Richard J. Drehobl

Richard Drehobl, National Monument Manager

Medford District Manager Recommendation
I recommend the proposed draft plan and EIS for State Director filing in accordance with 40 CFR 1500. Although the District staff has identified a preferred alternative, it is subject to change based on the inter-agency and public comments and further staff review. The proposed plan in the final EIS may be the same as the preferred alternative in the draft EIS or a combination of alternative elements. Upon completion of the approved plan and your approval of the record of decision, the Cascade-Siskiyou Ecological Emphasis Area will be deleted from the April 14, 1995 approved Medford Resource Management Plan and managed as a separate planning area.

Ron Wenker

Ron Wenker, Medford District Manager

Oregon/Washington State Director Concurrence and Approval to File
I concur that the draft plan and EIS have been prepared in accordance with applicable directives and is ready for filing with the Environmental Protection Agency, on behalf of the Council of Environmental Quality. The document is approved for filing as required by 40 CFR 1506.9.

Elaine Y. Zielinski

Elaine Y. Zielinski, Oregon/Washington State Director

CASCADE-SISKIYOU NATIONAL MONUMENT
RESOURCE MANAGEMENT PLAN
and
ENVIRONMENTAL IMPACT STATEMENT

(X) Draft Environmental Statement ( ) Final Environmental Statement

Responsible Agency: Department of the Interior, Bureau of Land Management

Type of Action: (X) Administrative ( ) Legislative

Abstract: This Draft Resource Management Plan/Draft Environmental Impact Statement (DRMP/DEIS) describes and analyzes the impacts of four alternatives for managing the public lands within the Cascade-Siskiyou National Monument (CSNM). The Monument currently includes 52,947 acres of Bureau managed lands, all in southeastern Jackson County, Oregon. The alternatives provide objectives and recommendations to protect and manage CSNM objects, resources and processes. Alternative A (no action) describes the existing management situation. The other alternatives were designed to protect, maintain, enhance and/or restore CSNM objects, resources and processes while allowing the public to enjoy this unique southwest Oregon landscape. The difference in the proposed alternatives is the degree of management intervention necessary to meet the desired goals and objectives. Alternative C is BLM's preferred alternative.

Comments: Comments on this document are requested from all interested and/or affected agencies, tribes, organizations, and individuals. In accordance with Bureau planning regulations, 43 *Code of Federal Regulations* (CFR) 1610.2(e), ninety (90) days shall be provided for review of this DRMP/DEIS. The ninety day period shall begin when the Environmental Protection Agency publishes a notice of the filing of the draft environmental impact statement in the *Federal Register*, most likely in May, 2002. The cover letter to this document provides specific dates addressing the end of the comment period and when a public meeting will be held to discuss the Draft Plan.

For further information contact:

Richard Drehobl, Interim Monument Manager
Bureau of Land Management, Medford District
3040 Biddle Road
Medford, OR 97504
541-618-2200

USER'S GUIDE

The Cascade-Siskiyou National Monument Draft Resource Management Plan and Draft Environmental Impact Statement is divided into two volumes. Volume I includes a summary, five chapters, glossary, references, and an index. Volume II includes maps and appendices. Also included is a large map of the analysis area (Plate 1).

The **Summary** is a synopsis of the Draft Resource Management Plan and Draft Environmental Impact Statement (DEIS/DEIS). Tables that briefly compare the respective alternatives and summarize the effects of the alternatives to the resources, processes and users are found within the summary.

Chapter 1 (Purpose and Need) contains introductory material for the Draft Resource Management Plan/DEIS. It describes the purpose and need for the preparation of the document and identifies the issues that will be addressed. It also describes the planning and scoping process and outlines the planning criteria.

Chapter 2 (Affected Environment) describes the environment that could be affected or impacted by implementing any of the alternatives. It includes a description of the environmental processes, resources and major uses related to the issues. Tables are found throughout the chapter.

Chapter 3 (Description of the Alternatives) is divided into the following sections: Introduction, Alternative A (No Action), Alternative B, Alternative C (Preferred), Alternative D, Management Common to All Alternatives, and Alternatives Considered But Eliminated From Detailed Analysis. Alternatives B, C and D describe various ways activities would be managed in the CSNM. Each alternative has a different emphasis, primarily defined in terms of resource focus, with the underlying premise to maintain, protect, restore or enhance relevant and important ecological and biological value(s). Tables that summarize some of the management activities of the proposed alternatives are found throughout the chapter.

Chapter 4 (Environmental Consequences) describes potential impacts and changes to the CSNM environment with the implementation of each of the alternatives. Tables summarizing effects to the resources, process or users are found throughout the chapter.

Chapter 5 (Consultation and Coordination) includes a summarization of public involvement, lists agencies and organizations receiving the document, and provides a List of Preparers for the Draft Resource Management Plan/DEIS.

The **Glossary, References and Index** provide an aid to the reader in finding and understanding the material contained in this document.

The **Maps** and **Appendices** in Volume II contains additional information to aid the reader in understanding the document. The large map (Plate 1) provides a more detailed look at the analysis area and can be used to locate specific points of interest mentioned in the text such as road numbers.

Abbreviations and Acronyms

BLM	Bureau of Land Management
BPM	Best Management Practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CSEEA	Cascade Siskiyou Ecological Emphasis Area
CSNM	Cascade-Siskiyou National Monument
CWA	Clean Water Act
CWD	Coarse Woody Debris
DEA	Diversity Emphasis Area
DEIS	Draft Environmental Impact Statement
DOI	Department of Interior
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FLPMA	Federal Land Policy and Management Act
FSEIS	Final Supplemental Environmental Impact Statement
GIS	Geographic Information System
HLRC	Hyatt Lake Recreation Complex
IMP	Interim Management Policy
JCWAA	Jenny Creek Watershed Assessment and Analysis
KIGWA	Klamath-Irongate Watershed Analysis
LSOG	Late-Successional and Old-Growth
LSR	Late Successional Reserve
MACS	Monument Aquatic Conservation Strategy
MDO	Medford District Office
MMBF	Million Board Feet
NEPA	National Environmental Protection Act
NHPA	National Historic Preservation Act
NPS	National Park Service
NRCS	Natural Resource Conservation Service
NWFP	Northwest Forest Plan
O&C	Oregon and California Railroad Company Revested Lands
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
OGEA	Old-Growth Emphasis Area
OHV	Off Highway Vehicle
ONHP	Oregon Natural Heritage Program
OWRD	Oregon Water Resources Department
PCNST	Pacific Crest National Scenic Trail
PSQ	Probable Sale Quantity
RMP	Resource Management Plan
RNA	Research Natural Area
ROD	Record of Decision
SCS	Soil Conservation Service
SSS	Special Status Species
TMDLs	Total Maximum Daily Loads
UBCWA	Upper Bear Creek Watershed Analysis
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geologic Service
WQMP	Water Quality Management Plan
WSA	Wilderness Study Area

SUMMARY

INTRODUCTION

The Cascade-Siskiyou National Monument (CSNM) was established on June 9, 2000 when President William J. Clinton issued a Presidential Proclamation (Appendix A) under the provisions of the Antiquities Act of 1906 (Appendix B). This Draft Resource Management Plan/Draft Environmental Impact Statement (DRMP/DEIS) provides possible management strategies that achieve the vision and goals pursuant to the Proclamation. The CSNM was created to protect an array of biological, geological, hydrological, archeological and historic objects. Although important individually, collectively these objects in the context of the natural environmental processes comprise a unique, diverse ecosystem.

The Proclamation, which is the principal direction for management of the CSNM, clearly dictates that the Bureau of Land Management (BLM) manage the Monument "to protect the objects identified." All other considerations are secondary to that edict. The guiding principle for management of the CSNM is to protect, maintain, restore or enhance relevant and important object(s). The Proclamation provided specific management direction and, thus, the alternatives presented in this draft Plan are necessarily constrained to those resources affording required protection. As a result, the range of alternatives presented in this planning document for the CSNM is narrower than typical BLM resource management plans.

ISSUES

Based on scoping comments received and subsequent analysis and evaluation, major planning issues were identified. Those issues are listed below. In addition to the issues identified in scoping, the proposed Plan will address basic environmental and management issues including native plant communities, wildlife habitat, access, recreational opportunities, off-highway vehicle use, special forest products, water quality and visitor use. Specific issues addressed in this DRMP/DEIS are:

- Plant Community Health
- Access and Transportation System
- Hiking/Non-Mechanized Recreation
- Visitor Use
- Special Forest Products
- Mechanized Recreation
- Recreational Animal Stock Use
- Facilities/Rights-of-Way

Livestock grazing management will not be addressed in this Plan. The Presidential Proclamation directed the Secretary of the Interior to "study the impacts of livestock grazing on the objects of biological interests in the Monument with specific attention to sustaining the natural ecosystem dynamics." The Draft Study of Livestock Impacts on the Objects of Biological Interest in the Cascade-Siskiyou National Monument (USDI 2001) was published in April, 2001. After the Draft Study Plan is peer reviewed and the public has an opportunity to submit comments, it will be finalized and fully implemented. The impacts of livestock grazing will be assessed upon completion of the study.

ALTERNATIVES

This Draft CSNM Resource Management Plan and Draft Environmental Impact Statement describes four alternatives for management of the CSNM, including a "No Action" Alternative A. The "No Action" Alternative will essentially serve as a baseline for most resource and land use allocations. It will allow the reader to compare various strategies for future management. The three "action" alternatives, Alternatives B, C and D, describe various ways activities would be managed in the CSNM. Each alternative has a different emphasis, primarily defined in terms of the amount of management intervention necessary to meet the primary goal of protecting, maintaining, restoring or enhancing relevant and important ecological, biological, geological, and archaeological objects.

Alternative A (No Action)

The No Action Alternative, Alternative A, describes the current management situation which is essentially the BLM Medford District Resource Management Plan guidance combined with the additional non-discretionary specific direction of the Presidential Proclamation. The No Action Alternative fails to provide or create opportunities for enhancement of the monument values beyond the immediate protective measures of the Proclamation. It allows the reader to compare the current interim management with various strategies for future management (Alternatives B, C and D). This alternative will serve as a baseline for most resource and land use allocations.

Alternative B

Alternative B promotes natural ecosystem processes in the management of plant communities. One exception to this philosophy would be in the management of young conifer stands that exist as a result of past management practices. In the young conifer stands, active management would be implemented to ensure the establishment of conifer trees. Activities such as recreation and visitor use are not promoted and accommodations for these uses would be minimal. The transportation system would be maintained at minimal levels mainly for resource protection and many roads would be closed and/or naturally decommissioned.

Alternative C

Alternative C is the preferred alternative. It incorporates active management for protection and maintenance of the conifer communities while limiting some ground disturbing management tools that may be used in maintaining and restoring the other plant communities. Recreation and visitor use is accommodated at levels that don't interfere with protection, maintenance and/or restoration of Monument objects and resources. The transportation system would be managed to accommodate visitor use and safety while closing and decommissioning roads (both mechanical and natural) in order to protect Monument resources.

Alternative D

Alternative D promotes aggressive management for protection, maintenance and restoration of Monument resources through the use of all management tools available. Recreation and visitor use would be accommodated to the fullest extent possible while protecting Monument resources. The transportation system would be managed to accommodate and promote visitor use, where feasible, and safety while aggressively closing and decommissioning roads (both mechanical and natural) in order to protect and restore Monument resources.

MANAGEMENT COMMON TO ALL ALTERNATIVES

Other important issues were raised during scoping which are of concern to the public, but which specific management direction as a result of the Presidential Proclamation, have been adequately addressed in other NEPA documents, are governed by existing laws and regulations or the scope is so narrow that alternatives to management is not appropriate. Because management of these issues has already been determined, alternatives for those issues are not presented in this Plan. The management of the following issues are discussed in further detail in the "Management Common to All Alternatives" section in Chapter 3.

- Aquatic Habitat
- The Soda Mountain Wilderness Study Area
- Wildfire Suppression Activities
- Special Use Activities
- Snags and Coarse Woody Debris
- Fish and Wildlife by the State of Oregon
- The Pacific Crest National Scenic Trail
- Special Status Plants and Animals
- Noxious Weeds
- Air Quality
- Archaeological Sites
- Hyatt Lake Recreation Complex
- Visual Resources
- Off-Highway Vehicles
- Livestock Grazing

Table S-1. Comparison of Alternatives

Issue	Alternative A	Alternative B	Alternative C	Alternative D
Vegetation Management of Diversity Area	• Survey plant communities to establish extent and condition • Vegetation manipulation only for control of noxious weeds • Install approximately 30 enclosures throughout CSNM as part of plant community study and to protect monument objects • Monitor existing sites	• Allow natural processes (succession, wildfire, etc) to attain management objectives relating to plant community and habitat diversity. • Use fencing to initiate restoration of hydrological functioning within seeps, springs, and wetlands to attain plant compositional structural objectives • Survey, protect and monitor populations of listed and Bureau special status plants • Reduce noxious weeds by: - Survey and monitoring plant communities for noxious weeds - Minimizing surface disturbance - Isolating and containing large weed patches - Emphasis on using management tools that minimize soil surface disturbance (bio-control, herbicide, hand-pulling)	•Maintain and enhance plant community & habitat diversity, and shrub browse quality - Use prescribed fire and manual treatments to attain the full range of compositional and structural management objectives defined for grass/shrub/woodlands - Use manual thinning to facilitate the use of prescribed fire across the landscape •Treat up to 20% of native grasslands for maintenance •Treat up to 15% of native grasslands being invaded by annual grasses for enhancement purposes •Treat up to 10% of areas dominated by annual grasses in order to restore to native grasslands •Treat up to 20% of wedgeleaf ceanothus stands for maintenance •Treat up to 25% of the oak woodlands for protection and maintenance •Treat up to 20% of the woodlands invaded by shrubs for restoration •Treat up to 10% of the open oak savanna for protection and restoration •Use fencing to initiate restoration of hydrological functioning within seeps, springs, and wetlands to attain plant compositional structural objectives, heavy equipment not allowed off designated roads •Reduce weeds by - Minimizing surface disturbance - Monitoring plant communities for weeds - Use management tools that minimize soil surface disturbance (bio-control, herbicide), and efficient weed control (herbicides not solely intended for noxious weeds) •All management activities preceded by pilot project • Effectiveness monitoring	Same as Alternative C but all management tools available to meet objectives

Table S-1. Comparison of Alternatives

Issue	Alternative A	Alternative B	Alternative C	Alternative D
Vegetation Management of Old-Growth Emphasis Area	• Survey plant communities to establish extent and condition • Monitor existing sites	The following prioritized criteria would be used when identifying treatment areas under Alternative B. 1) The overriding priority would be the reduction of high fuel hazards along the ridge line that separates the north/south management zones (map 42). 2) Where recent stand replacement events have occurred and it is determined that some treatment is needed to help re-establish trees. 3) Those ecoregions within the CSNM that currently lack LSOG habitat and have relatively high amounts of potential habitat (habitat 3). 4) Young stands that need to be treated to increase tree growth in order to accelerate the creation of LSOG habitat characteristics or to reduce moderate to high levels of insect and disease related mortality. 5) Where early-successional forest is adjacent to (generally within 1/4 mile) existing LSOG, such that treating it would lead to development of larger blocks of LSOG habitat. 6) Young stands (habitat 3) in areas generally lacking LSOG habitat and which will respond to treatment by accelerated development into LSOG habitat. Younger stands are generally considered more responsive to treatment and should be given a high priority. 7) Stands within riparian areas and subwatersheds lacking LSOG habitat and/or desired structures. 8) Effectiveness monitoring of all treated sites.	The following prioritized criteria would be used when identifying treatment areas under Alternative C. 1) The overriding priority would be the reduction of high fuel hazards along the ridge line that separates the north/south management zones. 2) Treatment of activity fuels (excess slash that results from stand treatments). 3) Where recent stand replacement events have occurred and it is determined that some treatment is needed to help re-establish trees. 4) Treatment of all stands with high fire hazard within ¼ mile of LSOG habitat (type 1&2) 5) Treatment of forest stands in habitat type 3 that have moderate fire hazard and that are within ¼ mile of existing LSOG habitat. 6) Treatment of LSOG habitat that have high fuel hazard. Non-commercial thinning may occur in some of these stands before fuel treatments to reduce the white fir components within LSOG habitat at risk due to density (decreased vigor), insect infestation, disease, or fuel ladders. 7) Effectiveness monitoring of all treated sites.	The following prioritized criteria would be used when identifying treatment areas under Alternative D. 1) The overriding priority being the reduction of high fuel hazards along the ridge line that separates the north/south management zones. 2) Treatment of activity fuels (excess slash that results from stand treatments). 3) Where recent stand replacement events have occurred and it is determined that some treatment is needed to help re-establish trees. 4) Treatment of all stands with high fire hazard within ¼ mile of LSOG habitat (type 1&2) 5) Treatment of all in habitat type 3 that have moderate fire hazard and that are within ¼ mile of existing LSOG habitat. 6) Treatment of LSOG habitat that have high fuel hazard. Non-commercial thinning may occur in some of these stands before fuel treatments to reduce the white fir components within LSOG habitat at risk due to density (decreased vigor), insect infestation, disease, or fuel ladders. 7) Treatment of existing LSOG habitat that have high fuel hazard by commercial thinning habitat types 1 and 2 with high fuel hazards and treating the activity fuels. 8) Treatment of all forest stands in habitat type 5 within ¼ mile of existing LSOG habitat that have moderate fuel hazard to reduce fuel loading. 9) Effectiveness monitoring of all treated sites.

Table S-1. Comparison of Alternatives

Issue	Alternative A	Alternative B	Alternative C	Alternative D
Special Forest Products	• No collection of any Special Forest Products in the CSNM except for administrative or traditional native American gathering purposes	• No collection of any Special Forest Products in the CSNM except for administrative or traditional native American gathering purposes	• No commercial collection of any Special Forest Products • No public collection of plant material except casual collection of mushrooms/fungi, for personal use • Special use permits issued for administrative purposes or traditional native American gathering purposes • Firewood collection personal use allowed by permit only in slash decks • Collection of rock/gems for personal use only by permit in pre-designated sites	• No commercial collection of any Special Forest Products • No public collection of plant material except casual collection of mushrooms/fungi, for personal use • Special use permits issued for administrative purposes or traditional native American gathering purposes • Firewood collection personal use allowed by permit only in slash decks and treatments areas where pre-designated trees are marked • Casual collection of rock/gems for personal use only by permit in pre-designated sites

Table S-1. Comparison of Alternatives

Issue	Alternative A	Alternative B	Alternative C	Alternative D
Transportation System	The transportation plan would be similar to current management except for the specific roads listed below and map 30. These roads were closed to use by unauthorized vehicles as part of interim management. • Closed Schoheim road (41-2E-10.1), except between the southwest section line of T.40S.,R.4E.,Sec.4 and the Copco road where it provides access to private property. • Closed Randcore Pass Road (40-4E-19.2) past the junction with road 40-4E-31.0 • Closed Skookum Creek road (40-2E-28 and 40-3E-27.2) past the junction with road 40-3E-27.1 • Closed road 41-2E-3.0 past the point where it crosses the Pacific Crest National Scenic Trail • Closed road 41-3E-9.0 past the barricade in T41S, R2 E, Section 9, SW1/4NW1/4 • Closed Lone Pine Ridge Road (40-3E-31) past the block in T40S, R3E Section 31 • Closed an unnumbered road which crosses the Oregon-California border at the section line between sections 7 and 18, T41S, R4E • Closed an unnumbered road which crosses the Oregon-California border at the south section line of Section 13, T41S, R2E	The transportation plan would be similar to the other alternatives except for the specific roads listed below and map 31 • Schoheim road (41-2E-10.1): the western portion would be closed and left to decommission naturally, the eastern portion would be closed for use by unauthorized vehicles except between the southwest section line of T.40S.,R.4E.,Sec.4 and the Copco road where it provides access to private property • Randcore Pass Road (40-4E-19.2) past the junction with road 40-4E-31.0 would be closed for use by unauthorized vehicles • Skookum Creek road (40-2E-28 and 40-3E-27.2) past the junction with road 40-3E-27.1 would be closed for use by unauthorized vehicles • Close the Pilot Rock access road (BLM #40-2E-33) where it intersects old Highway 99 with a gate to prevent vehicle access • Road 41-2E-9.0 past the barricade in T41S, R2E, Section 9, SW1/4NW1/4 would be closed and left to decommission naturally .	The transportation plan would be similar to the other alternatives except for the specific roads listed below and map 32 • Schoheim road (41-2E-10.1); the western portion would be closed and mechanically decommissioned, the middle portion would be closed and left to decommission naturally, the eastern portion would be closed for use by unauthorized vehicles except between the southwest section line of T.40S.,R.4E.,Sec.4 and the Copco road where it provides access to private property. • Pilot Rock Road (41-2E-3.0) past the point where it crosses the Pacific Crest National Scenic Trail would be closed and mechanically decommissioned • Maintain Pilot Rock access road (BLM #40-2E-33) in current condition. • Randcore Pass Road (40-4E-19.2) past the junction with road 40-4E-31.0 would be closed for use by unauthorized vehicles • Skookum Creek road (40-2E-28 and 40-3E-27.2 Segment A) past the junction with road 40-3E-27.1 would be improved down to where Sections 36 (T.40S.,R.3E.)and 1(T.41S.,R.3E)meet and closed to unauthorized vehicles between November [illegible] and April 1 of each year. Skookum Cr. road past the common line of Sec. 36 (T.40S.,R.3E.) and Section 1 (T.41S.,R.3E) would be close to unauthorized traffic throughout the year. • Improve the Soda Mountain lookout road for extended season use and install a gate where spur road takes off to the lookout.	The transportation plan would be similar to the other alternatives except for the specific roads listed below and map 33 • Schoheim road (41-2E-10.1); most of the road would be closed and mechanically decommissioned, the eastern portion would be closed for use by unauthorized vehicles except between the southwest section line of T.40S.,R.4E.,Sec.4 and the Copco road where it provides access to private property. • Randcore Pass Road (40-4E-19.2) past the junction with road 40-4E-31.0 would be closed and mechanically decommissioned. • Skookum Creek road (40-2E-28 and 40-3E-27.2) past the junction with road 40-3E-2[illegible] would be improved and [illegible] open to the public throughout the year down to where Section 36 (T.40S.,R.3E.) and Section 1(T.41S.,R.3E) meet. Skookum Creek road past where Section 36 (T.40S.,R.3E.) and Section 1(T.41S.,R.3E) meet would be closed to unauthorized use and major portion of the road mechanically decommissioned. • Improve spur road in Section 21 (T.40S.,R.3E.) that ties back into the BLM 39-3E-32.3 road • Pilot Rock Road (41-2E-3.0) past the point where it crosses the Pacific Crest National Scenic Trail would be closed and mechanically decommissioned. • Improve the Pilot Rock road (BLM #40-2E-33&41-2E-3.0 before the PCNST) to allow all season use. This may include surface rock or surface rock plus oil.

Table S-1. Comparison of Alternatives

Issue	Alternative A	Alternative B	Alternative C	Alternative D
Transportation system (cont.)		• Lone Pine Ridge Road (40-3E-31) past the block in T40S, R3E Section 31 would be closed and left to decommission naturally • The un-numbered road which crosses the Oregon-California border at the section line between sections 7 and 18, T41S, R4E would be closed for use by unauthorized vehicles • The un-numbered road which crosses the Oregon-California border at the south section line of Section 13, T41S, R2E would be closed and left to decommission naturally.	• Road 41-2E-9.0 (segments A&B) past the barricade in T41S, R2 E, Section 9, would be closed and mechanically decommissioned • Lone Pine Ridge Road (40-3E-31) past the block in T40S, R3E Section 31 would be closed and left to decommission naturally • The un-numbered road which crosses the Oregon-California border at the section line between sections 7 and 18, T41S, R4E would be closed for use by unauthorized vehicles • The un-numbered road which crosses the Oregon-California border at the south section line of Section 13, T41S, R2E would be closed and mechanically decommission.	• Road 41-3E-9.0 past the barricade in T41S, R2 E, Section 9, SW1/4NW1/4 would be closed and mechanically decommissioned. • Lone Pine Ridge Road (40-3E-31) past the block in T40S, R3E Section 31 would be closed and mechanically decommissioned. • The un-numbered road which crosses the Oregon-California border at the section line between sections 7 and 18, T41S, R4E would be closed for use by unauthorized vehicles. • The un-numbered road which crosses the Oregon-California border at the south section line of Section 13, T41S, R2E would be closed and mechanically decommissioned.
Mechanized Recreation	• All forms of mechanized recreation are restricted to roads designated for public access • Snowmobiles are allowed on roads in the designated areas listed on map 53	• All forms of mechanized recreation are restricted to roads designated for public access • No roads would be designated for snowmobile use thus the Monument would be closed to snowmobiles	• All forms of mechanized recreation are restricted to roads designated for public access • Designating roads specifically for non-motorized mechanized recreation could be considered in the future • All BLM-administered roads in the north zone (map 42) of the Monument would be designated for snowmobile use except roads designated as closed or decommissioned	• All forms of mechanized recreation are restricted to roads designated for public access • Designating existing roads or constructing new roads specifically for non-motorized mechanized recreation could be considered in the future • All BLM-administered roads in the Monument would be designated for snowmobile use except roads designated as closed or decommissioned

Table S-1. Comparison of Alternatives

Issue	Alternative A	Alternative B	Alternative C	Alternative D
Non-mechanized Recreation	• Pacific Crest National Scenic Trail is the only designated trail • No new hiking trails would be constructed pending completion of the CSNM management plan • Hiking allowed throughout the CSNM • Camping allowed throughout CSNM • Campfires allowed throughout CSNM • No current restrictions on rock climbing • No current restrictions on hang gliding or para-sailing	• No new hiking trails would be designated • No new trails would be constructed • Hiking in RNAs confined to existing roads/trails • No camping in monument except at designated campground (Hyatt Lake) and dispersed "no trace" camping along the PCNST • Campfires allowed only in existing grates/rings in Hyatt Lake campground • Technical rock climbing, hang gliding, or para-sailing is not allowed in the CSNM	• The Pacific Crest National Scenic Trail is the only officially designated trail in CSNM. • Allows proposal of new hiking trail designation or construction in the future to be analyzed only within designated visitor use concentration zones (map 42) • Hiking in RNAs confined to existing roads/trails • Dispersed "no trace" camping allowed across entire monument except for the RNAs and structures in the Box-O ranch area • Organized Groups that have existing permits would be allowed to camp outside of designated campground (Hyatt Lake). Renewal of permit would be analyzed to ensure its consistency with protection of monument objects. No new applications for group camping would be accepted • Group camping would be allowed for administrative purposes • Campfires allowed within CSNM except the RNAs • Technical Climbing not allowed in the CSNM • Hang Gliding/Para-Sailing allowed in designated areas by permit only	• The Pacific Crest National Scenic Trail is the only officially designated trail in CSNM. • Allows proposal of new trail designation or construction in the future to be analyzed across monument except in the WSA and RNAs • Hiking in RNAs confined to existing roads/trails • Dispersed "no trace" camping allowed across entire monument except for the RNAs and structures in the Box-O ranch area • Organized Groups that have existing permits would be allowed to camp outside of designated campground (Hyatt Lake). Renewal of permit would be analyzed to ensure its consistency with protection of monument objects. A limited number of new applications for group camping would be analyzed to ensure consistency with protection of monument objects • Group camping would be allowed for administrative purposes • Campfires allowed within CSNM except the RNAs • Technical Rock Climbing allowed on Pilot Rock only • Hang Gliding/Para-Sailing allowed in all areas of the monument except the WSA and RNAs

Table S-1. Comparison of Alternatives

Issue	Alternative A	Alternative B	Alternative C	Alternative D
Recreational Animal Stock Use	• Allowed throughout the CSNM except in RNAs • Commercial recreational animal stock use operations would not be considered in the CSNM until completion of management plan	• Not allowed in the CSNM	• Recreational animal stock use would be allowed for recreational purposes only (No commercial recreational animal stock use) • Not allowed in RNAs. • Number of stock per group would be 4 animals on overnight trips and 6 animals on day trips. • Animals can not overnight within 200 feet of waters edge (includes springs, seeps, and streams) • Activity not allowed in South Mgt. Zone (map 42) from Nov.15 to May 1	• Not allowed in RNAs. • Number of stock per group would be 8 animals on overnight trips and 12 animals on day trips. • Animals can not overnight within 100 feet of waters edge (includes springs, seeps, and streams) • Animals should be fed weed free food at least 24 hours prior to entering the Monument • No requirement to furnish food for recreational animals stock, but if feed is furnished certified weed-free feed can be supplied • Commercial recreational animal stock use would not be allowed in WSA or RNAs • Only 3 special recreation permits for commercial recreational stock use would be issued each year. Permits would have specific restrictions that protect CSNM objects. • Permittees would be allowed only on pre-designated routes/camp sites with specific restrictions applied • Number of stock per commercial group would be 8 animals on overnight trips and 12 animals on day trips • Recreational commercial stock animals can not overnight within 200 feet of waters edge (includes springs, seeps, and streams) • Food for commercial stock animals must be brought in (No grazing) • Feed brought in to CSNM must be certified weed-free • Animals should be fed weed free food at least 24 hours prior to entering the Monument • Commercial recreational animal stock use activity is not allowed in South Mgt. Zone (map 42) from Nov.15 to May 1

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Issue	Alternative A	Alternative B	Alternative C	Alternative D
Visitor Facilities	• Use of existing visitor facilities: - BLM Medford District Office as official visitor center - BLM Hyatt Lake Recreation Complex as service center - Oregon Visitor Center in Ashland as service center • No parking off of roads except at designated sites • No new parking/trailhead facilities allowed only as needed for resource protection • New toilet facilities would constructed or furnished as needed for resource protection • Continue use and maintenance of existing signs/interpretive sites for protection monument objects and provide travel information • New interpretive sites could be developed consistent with monument objects protection • New signs would be installed only for protection of CSNM objects and public safety	• Use of existing visitor facilities without improvements: - BLM Medford District Office as official visitor center - BLM Hyatt Lake Recreation Complex as service center - Forest Service in Ashland as service center • No parking off of roads except at designated sites • No new facilities would be designated or constructed • Maintain existing designated facilities which include: - Pilot Rock parking facility at Pacific Crest National Scenic Trail (PCNST) - Pilot Rock parking facility at Rock Quarry below PCNST - Soda Mtn. parking facility at PCNST - Porcupine Gap parking facility at PCNST - Horse Corrals at old Highway 99 - Hyatt Lake Recreation Complex • No new toilet facilities would constructed or furnished • Continue use and maintenance of existing signs/interpretive sites to protect monument objects and provide travel information • No new interpretive sites would be developed • New signs would be installed only for protection of CSNM objects	• Improve/Alter existing facilities if necessary to accommodate visitors • Potential of development of visitor center facility in local community • No parking off of roads except at designated sites • Maintain existing designated parking and trailhead sites • Improve/Alter existing designated parking/trailhead sites in the recreation concentration zone (map 42) • Consider new parking/trailhead facilities only within recreation concentration zone • Temporary toilets would be provided where necessary for public health and safety • New permanent toilet could be constructed only in the Hyatt Lake Recreation complex • Continue use and maintenance of existing signs/interpretive sites for protection of monument objects and to provide travel information • Improvements/alterations of existing signs/interpretive sites could occur only in the recreation concentration zones within the north management zone (map 42) • New interpretive sites and/or signs could be developed, as needed, in the recreation concentration zones within north management zone for: - resource protection - provide travel information - provide educational information - provide for public safety • No new interpretive sites would be developed in the south management zone and new signs would be installed only for resource protection, navigation, and/or public safety	• Improve/Alter existing facilities if necessary • Potential for acquisition of existing facility (pvt/coop/govt) for visitor center facility within CSNM • Potential of acquisition or construction of new visitor center facility in surrounding community • Potential for construction of new visitor center in the recreation concentration zone of CSNM • No parking off of roads except at designated sites • Maintain existing designated parking/trailhead sites • Improve/Alter existing designated parking/trailhead sites throughout CSNM • Consideration of new parking/trailhead facilities throughout CSNM • Toilet facilities would be maintained at existing sites which are at the Hyatt Lake Recreation Complex plus temporary toilets would be provided where necessary for public health and safety • New permanent toilet could be constructed only in the recreation concentration zone for public health and safety (map 42) • Continue use and maintenance of existing signs/interpretive sites for protection monument objects and provide travel information • Improve/Alter existing signs/interpretive sites as needed • New interpretive sites and/or signs could be developed as needed throughout the CSNM

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Table S-1. Comparison of Alternatives

Issue	Alternative A	Alternative B	Alternative C	Alternative D
Linear Rights-of-Way	• New Rights-of-Way (ROW) applications are accepted and analyzed • New facilities could be constructed in CSNM as long as they don't interfere with protection of resource and or monument object(s) • New communication site proposals would be analyzed for consistency in protecting monument objects • New facilities could be built at existing communication sites with some VRM limitations.	• No new Rights-of-Way (ROW) except for valid existing rights (VER) • No new facilities constructed in CSNM • No new communication sites • No new additional facilities at existing communication sites	• No new ROW except for VER • Allow limited construction of new utility facilities and alteration of existing utilities that meet Visual Resource Mgt. objectives and don't interfere with protection of objects in the monument • Maintenance of ROW consistent with protection of CSNM objects • No new communication sites • No new additional facilities at existing communication sites • Mitigate visual affects of existing communication sites	• No new ROW except for Valid Existing Rights • Allow limited construction of new utility facilities and alteration of existing utilities that meet Visual Resource Management objectives and don't interfere with protection of objects in the Monument • Maintenance of ROW consistent with protection of CSNM objects • No new communication sites • New facilities could be built on existing communication site that meet VRM objectives • Develop a site specific management plan which addresses site efficiency and visual resources

Environmental Consequences

Analysis Assumptions and Guidelines

The following assumptions and guidelines were used to guide and direct the analysis of environmental consequences:

- The alternatives would be implemented substantially, as described in Chapter 3, including the Management Common To All Action Alternatives.
- The Bureau of Land Management would have sufficient funding and personnel to implement and enforce the plan.
- Current trends in recreation use would continue.
- The planning period for the analysis is the next 10 years at which time the BLM will evaluate the plan and make necessary adjustments. Short-term impacts are those that would occur during the first five years of plan implementation. Long-term impacts are those that would occur beyond the first five years.
- Specific actions to protect human life would be taken regardless of the management criteria in the plan alternatives.
- Livestock grazing in the Monument will continue at present levels (Alternative A) and will be governed by applicable laws and regulations. Once sufficient data is gathered from the study to determine impacts of livestock grazing on the objects of biological interest, a Plan amendment addressing livestock grazing activities would be completed.
- Research and monitoring would be fully funded.
- The Best Management Practices (Appendix AA) and Monument Aquatic Conservation Strategy (Appendix BB) are common to all action alternatives.
- Site specific NEPA analysis including required surveys would be accomplished before implementation of activities in the proposed alternatives.

Summary of Environmental Consequences

The following tables briefly summarize the effects of the proposed alternatives to important resources, processes or objects of the Cascade-Siskiyou National Monument. In most cases, summarizing only gives a broad overview of the effects to the important resources, processes or objects of the Monument. A complete analysis of the environmental consequences as a result of the proposed alternatives can be found in Chapter 4.

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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Potential Vegetation Treatments for Late-successional and Old-Growth Protection	0 acres	3,400 acres	7,800 acres	14,200 acres
Potential Vegetation Treatments for Diversity Emphasis	0 acres	0 acres	2,000 acres	2,000 acres
Potential Vegetation Treatments for Noxious Weed Management	3,000 acres	3,000 acres	3,000 acres	3,000 acres
Potential new trail construction for non-mechanized vehicles	0 miles	0 miles	0 miles	20 miles
Land available for communication sites	3 acres	3 acres	3 acres	3 acres
Miles of major utility corridors available	15 miles	15 miles	15 miles	15 miles
Number of property owners denied reasonable access to their property	0	0	0	0
Land under reciprocal Rights-of-Way agreement	30,260 acres	30,260 acres	30,260 acres	30,260 acres
Mechanical Decommission	0 miles	0 miles	24 miles	52 miles
Natural Decommission	0 miles	49 miles	28 miles	6 miles
Improve Drainage and Block Road to the Public	77 miles	28 miles	21 miles	12 miles
Improve Road and Leave Open	0 miles	3 miles	0 miles	3 miles
Block Road to Public	0 miles	3 miles	4 miles	7 miles
Miles of BLM managed roads open and maintained for public use	174 miles	168 miles	174 miles	171 miles

Table S-3. Comparison of Impacts of the Proposed Alternatives

Alternative A	Alternative B	Alternative C	Alternative D
Cultural Resources			
Interim road closures of over seventy miles has limited access and disturbance to most cultural sites.	Closure of about 30 miles of road and natural decommission of about 50 miles further limits site disturbance.	Closure of 25 miles of road and natural decommission of 28 miles limits site disturbance. Mechanically decommissioning 24 miles of road increases potential of disturbing sites.	Closure of 19 miles of road and natural decommission of 6 miles limits site disturbance. Mechanically decommissioning 52 miles of road greatly increase risk of site disturbance.
No vegetation management results in minimal disturbance to sites.	Minimal amount of vegetation management results in small potential of disturbance to sites.	Moderate amount of vegetation management increases potential for site disturbance although minimal use of mechanical equipment lowers risk of disturbance.	Moderate amount of vegetation management using heavy equipment has highest potential for site disturbance.
Increase in visitation as a result of Monument designation has resulted in unauthorized collecting of artifacts.	Increase in visitation as a result of Monument designation has resulted in unauthorized collecting of artifacts.	Increase in visitation as a result of Monument designation has resulted in unauthorized collecting of artifacts.	Increase in visitation as a result of Monument designation has resulted in unauthorized collecting of artifacts.
Dispersed grazing does not have an affect on archeological resources.	Dispersed grazing does not have an affect on archeological resources.	Dispersed grazing does not have an affect on archeological resources.	Dispersed grazing does not have an affect on archeological resources.

Table S-3. Comparison of Impacts of the Proposed Alternatives

Alternative A	Alternative B	Alternative C	Alternative D
		Soils	
Interim road closure of about 77 miles of natural surface roads has decreased surface disturbance and erosion. Erosion rates on closed roads will remain above natural levels. Existing roads that are open for all season use receiving very minimal maintenance resulting in degradation of road surface and ditch lines and increased erosion rates. No vegetation treatments results in no increase in surface disturbance short-term but risk of catastrophic fire increases which could result in very high soil erosion rates.	Closure of about 30 miles of natural surface roads decreases surface disturbance and erosion. Erosion rates on closed roads will remain above natural levels. Pulling culverts and installing natural drainage facilities to 49 miles of natural decommission roads will result in short-term increase in erosion rates but long-term decrease in erosion rates as these areas return to near natural erosion rates. Minimal vegetation management would result in limited surface disturbance and slight increase in short-term erosion rates. Has slight affect on reducing fire hazard long-term.	Closure of 25 miles of road limits soil surface disturbance and decreases existing erosion rates. Erosion rates would continue to be slightly above natural rates long-term. Natural decommissioning of 28 miles of road will result in short-term increase in erosion rates but long-term decrease in erosion rates as these areas return to near natural erosion rates. Mechanically decommissioning 24 miles of road increases short-term erosion rates but long- term erosion rates would return to near natural levels. Vegetation manipulation of approximately 7,000 acres for fuel hazard reduction and another 2,000 for diversity management would increase erosion rates slightly short-term but decreases risk of catastrophic fire thus reducing very high long-term erosion rate increases.	Closure of 19 miles of road limits soil surface disturbance and decreases existing erosion rates. Erosion rates would continue to be slightly above natural rates long-term. Natural decommissioning of 6 miles of road will result in short-term increase in erosion rates but long-term decrease in erosion rates as these areas return to near natural erosion rates. Mechanically decommissioning 52 miles of road increases short-term erosion rates but long- term erosion rates would return to near natural levels. Vegetation manipulation of approximately 14,000 acres for fuel hazard reduction and another 2,000 for diversity management would increase erosion rates slightly short-term but decreases risk of catastrophic fire thus minimizing the risk of very high long-term erosion rate increases. Use of heavy equipment would have moderate short term negative effects and moderate positive long-term effects.
		Aquatic & Riparian Habitat	
Slight decrease in sediment from closing roads. Maintain hazardous fire conditions.	Short-term moderate decrease in sediment from closing and decommissioning roads. Long-term effects are: Slow recovery of naturally decommissioned roads resulting in above natural level sedimentation rates for a longer period of time. - Improved CWD recruitment, lower water temperatures, increase in humidity as a result of an acceleration toward late-successional characteristics in riparian areas. - Reduced fire hazard resulting in decrease risk of catastrophic disturbance in riparian areas.	Short-term negative effects from potential sediment pulses from road decommissioning but improved condition of seeps and springs. Long-term faster recovery of decommissioned roads resulting in sedimentation rates returning to natural levels within a few years after decommissioning. - Reduced fire hazard resulting in decrease risk of catastrophic disturbance in riparian areas.	Short-term negative effects from potential sediment pulses from road decommissioning but improved condition of seeps and springs. Long-term faster recovery of decommissioned roads resulting in sedimentation rates returning to natural levels within a few years after decommissioning. - Reduced fire hazard resulting in decrease risk of catastrophic disturbance in riparian areas.

Table S-3. Comparison of Impacts of the Proposed Alternatives

Alternative A	Alternative B	Alternative C	Alternative D
Hydrological Processes			
Low to moderate short-term negative effects on Peak flow as 174 miles of existing roads has increased surface run-off over natural rates but minimal areas of ground disturbance and vegetation removal is occurring in transient snow zones.	Low to moderate short-term negative effects on Peak flow as amount of proposed vegetation treatments is not enough to have discernable increase. The positive effects of naturally decommissioning roads will not be realized in the short-term.	Low to moderate short-term negative effects on Peak flow as amount of proposed vegetation treatments does not decrease soil infiltration rates and does not increase runoff potential. Mechanical Decommissioning of 24 miles of road will increase infiltration rates and lower runoff.	Low to moderate short-term negative effects on Peak flow as amount of proposed vegetation treatments does not decrease soil infiltration rates and does not increase runoff potential. Mechanical Decommissioning of 52 miles of road will increase infiltration rates and lower runoff.
Low to moderate negative short-term affects on summer low flow resulting from water withdrawals.	Low to moderate negative short-term affects on summer low flow resulting from water as withdrawals do not decrease.	Low to moderate negative short-term affects on summer low flow resulting from water as withdrawals do not decrease and effects of riparian enhancement projects are not discernable.	Low to moderate negative short-term affects on summer low flow resulting from water as withdrawals do not decrease and effects of riparian enhancement projects are not discernable.
Cumulative effects are low to moderate on Peak flow as vegetation in transient snow zone area matures but the risk of catastrophic fire increases.	Cumulative effects are low to moderate on Peak flow as vegetation in transient snow zone area matures and small amount of vegetation treatments proposed does not decrease the risk of catastrophic fire.	Cumulative negative effects are low to moderate on Peak flow as vegetation in transient snow zone area matures and vegetation treatments lower fire hazard rating and slightly decreases the risk of catastrophic fire.	Cumulative negative effects are low to moderate on Peak flow as vegetation in transient snow zone area matures and vegetation treatments lower fire hazard rating and moderately decreases the risk of catastr[illegible]hic fire.
Cumulative effects on summer low stream flow is low as little change in water withdrawal is anticipated.	Cumulative effects on summer low stream flow is low as little change in water withdrawal is anticipated.	Cumulative effects on summer low stream flow is low as little change in water withdrawal is anticipated.	Cum[illegible]ffects on summer low st[illegible] is low as little change [illegible]hdrawal is anticipa[illegible]
Low to moderate short and long term negative effects on water quality parameters are minimal as existing roads keep turbidity rates slightly over natural rates. Riparian vegetation is maturing but having little affect on reducing high summer temperature that results in low dissolved oxygen.	Low to moderate short and long term negative effects on water quality parameters are minimal as existing roads have turbidity rates slightly over natural rates. Riparian vegetation maturing but little affect on reducing high summer temperature that results in low dissolved oxygen. Vegetation treatments have negligible impact on water quality.	Low to moderate short and long term negative effects on water quality parameters as 24 miles existing roads will be mechanically decommissioned slightly increasing turbidity rates existing rates. Existing vegetation maturing but will have little effect on reducing high summer temperature that results in low dissolved oxygen. Sediments from vegetation treatments slightly increase turbidity.	Low to moderate short and long term negative effects on water quality parameters as 52 miles existing roads will be mechanically decommissioned slightly increasing turbidity rates existing rates. Existing vegetation maturing but little effect on reducing high summer temperature that results in low dissolved oxygen. Sediments from vegetation treatments slightly increase turbidity.
Bacteria Pathogens currently found in many streams.	No proposed actions to reduce Bacteria Pathogens found in many streams.	No proposed actions to reduce Bacteria Pathogens found in many streams.	No proposed actions to reduce Bacteria Pathogens found in many streams.

[illegible]	[illegible]	[illegible]	[illegible]
Terrestrial Wildlife			
Essentially no habitat manipulation or fuels reduction treatment thus no immediate short term effects to wildlife habitat. In the long term, the continuing problem of increasing fire hazard due to fuels build-up in both early- and late-successional habitats as large tree mortality associated with excessive stand density in conifer stands continues. Early-successional associated species would generally not benefit in the short- or long-term as brush fields are becoming decadent and unproductive, oak woodlands are being encroached upon by conifers and brush and this alternative does nothing to reverse these trends.	Long- and short-term effects of this alternative on wildlife are expected to be very similar to those described under Alternative A except slight decrease in hazard fuel reduction. Early-successional associated species would generally not benefit in the short- or long-term as brush fields are becoming decadent and unproductive, oak woodlands are being encroached upon by conifers and brush and this alternative does nothing to reverse these trends. Treating 2,346 acres of young stands would have no negative effect on late-successional associated species.	Fuel reduction measures and silvicultural treatments in the type 5 stands could temporarily reduce the canopy closure to the point that the treated stands (839 acres) no longer function in the short term as dispersal habitat for Northern Spotted Owls Fuel reduction treatments could have slight short-term negative effects on the suitability of the forest stands in the short-term (5-10 years)for late-successional species as forest canopy is opened up reducing dispersal habitat. Late-successional habitat associated species would benefit long-term as a result of this alternative because 3,185 acres of stands with potential to become late-successional habitat (types 3 and 5) would be treated with that goal in mind. Early-successional species would benefit from treatments in these stands. Forage availability for a variety of species would be increased, and the loss of early-successional habitat to the process of succession would be slowed.	Fuel reduction measures and silvicultural treatments in the type 5 stands could temporarily reduce the canopy closure to the point that the treated stands (7,239 acres)are no longer function in the short term as dispersal habitat for Northern Spotted Owls but would increase the rate of development of late-successional stand characteristics in the long term. Treatment of about 1,770 of mature forest stands with high fuel hazard would result in a decrease late-successional habitat quality in the short-term due to loss of canopy closure and stand complexity but long term positive effects as desired long-term stand development and fire protection objectives are met. Same effects to early-successional habitat associated species as Alternative C but on a slightly larger scale across the landscape.

Vegetation			
Alternative does not allow for the development of a fire maintenance program that would lower the fire hazard in grasslands.	Alternative does not allow for the development of a fire maintenance program that would lower the fire hazard in grasslands.	Prescribed fire is a useful tool in former grasslands currently invaded by shrubs.	Prescribed fire is a useful tool in former grasslands currently invaded by shrubs. Use of heavy equipment will enhance the spacial and temporal effectiveness of prescribed fire.
Non-native annual grass invasion within the CSNM is likely to continue. Encroachment of shrub and conifers would continue decline of meadows and woodlands.	Non-native annual grass invasion within the CSNM is likely to continue. Encroachment of shrub and conifers would continue decline of meadows and woodlands.	Applications of prescribed fire, defoliation treatments, and herbicides could favor the native herbaceous component and retard the condition decline of meadows and woodlands.	Applications of prescribed fire, defoliation treatments, and herbicides could favor the native herbaceous component and retard the condition decline of meadows and woodlands. Use of heavy equipment will enhance the spacial and temporal effectiveness.
Not converting previous irrigated pastures to dryland species will continue decline of vegetation condition.	Not converting previous irrigated pastures to dryland species will continue decline of vegetation condition.	Restoration of irrigated pasture improve condition of vegetation communities.	Restoration of irrigated pasture improve condition of vegetation communities. Heavy equipment will accelerate conversion process but may increase potential of noxious weed spread.
Young forest stands will develop into dense slow growing and fire prone stands of pine or mixed conifer.	Young forest stands will develop into dense slow growing and fire prone stands of pine or mixed conifer.	Ninety percent of young conifer stands would be thinned which would enhance tree growth and reduce wildfire hazard.	Ninety percent of young conifer stands would be thinned which would enhance tree growth and reduce wildfire hazard.
Mature forest stands will grow slowly within residual groups of larger trees left from previous logging.	Mature forest stands will grow slowly within residual groups of larger trees left from previous logging.	Fifteen percent of mature conifer stands would be thinned noncommercially and underburned reducing fire hazard and increasing growth of remaining trees.	Fifteen percent of mature conifer stands would be thinned noncommercially and underburned reducing fire hazard and increasing growth of remaining trees.
		Approximately 839 acres of middle-aged conifer stands would be commercially and/or non-commercially thinned as groups of dense trees would be thinned from below resulting in accelerated growth of remaining vegetation and reduction in fire hazard.	Approximately 7,239 acres of middle-aged conifer stands would be commercially and/or non-commercially thinned as groups of dense trees would be thinned from below resulting in accelerated growth of remaining vegetation and reduction in fire hazard.
No significant direct or indirect effects will occur to sensitive plants from alternative; existing populations will continue to exist and be exposed to natural random events.	No significant direct or indirect effects will occur to sensitive plants from alternative; existing populations will continue to exist and be exposed to natural random events.	Potential to adversely affect localized sensitive plant species and small populations of rare plants, mostly from direct physical impacts. Cumulative effects are low to moderate as disturbance is increased.	Potential to adversely affect localized sensitive plant species and small populations of rare plants, mostly from direct physical impacts. Cumulative effects are moderate as disturbance is increased from heavy equipment.

[illegible]	[illegible]	[illegible]	[illegible]
Wildfire Suppression			
No reduction in fuel loading results in continued increase in fire hazard which would decrease wildfire suppression effectiveness. Temporary road closures slightly impairs access of initial attack forces. All existing roads that were identified by ODF that are critical for suppression needs in the area south Soda Mountain, Pilot Rock, and Keene Ridge would be available for fire suppression efforts.	Small amount of fuel reduction results in small decrease in fire hazard slightly increasing wildfire suppression effectiveness. Natural decommissioning of 49 miles of road that were temporarily closed. All existing roads that were identified by ODF that are critical for suppression needs in the area south Soda Mountain, Pilot Rock, and Keene Ridge would be available for fire suppression efforts.	Moderate amount of fuel reduction results in decrease in fire hazards further increasing wildfire suppression activities. Mechanical decommission of 24 miles of road does not change effects on initial attack activities but could slightly hamper extended attack efforts in the long term. All existing roads that were identified by ODF that are critical for suppression needs in the area south Soda Mountain, Pilot Rock, and Keene Ridge would be available for fire suppression efforts. Improvements would be done on the Skookum Creek road and the Soda Mountain lookout road which could increase response time to fires. This would be a positive impact to suppression efforts.	Moderate amount of fuel reduction results in decrease in fire hazards further increasing wildfire suppression activities. Mechanical decommission of 52 miles of road does not change effects on initial attack activities but could hamper extended attack efforts in the long term. All existing roads that were identified by ODF that are critical for suppression needs in the area south Soda Mountain, Pilot Rock, and Keene Ridge would be available for fire suppression efforts. Improvements would be done on the Skookum Creek road and the Soda Mountain lookout road which could increase response time to fires. This would be a positive impact to suppression efforts. Existing system that runs from Keene Ridge through Agate Flat to the Copco road. The roads that allow important tie route to occur are the Skookum Creek road which runs from Keene Ridge to the Schoheim road in the Agate flat area which then ties into the Copco road. This Alternative would decommission the lower 1½ miles of the Skookum Creek road which would in effect block this tie system which could moderately affect initial attack efforts in that area.
Transportation System			
All motorized and non-motorized mechanized travel is prohibited on the Schoheim road (BLM road 41-2E-10.1) and temporarily restricted on approximately 77 miles of roads. Approximately 174 miles of road open and maintained.	All motorized and non-motorized mechanized travel is prohibited on the Schoheim road (BLM road 41-2E-10.1) and approximately 49 miles of roads will be naturally decommission and 28 miles will be remain under temporary closure. Approximately 168 miles of road open and maintained.	All motorized and non-motorized mechanized travel is prohibited on the Schoheim road (BLM road 41-2E-10.1) and approximately 28 miles of roads will be naturally decommission, 24 mechanically decommissioned and 21 miles will be remain under temporary closure. Approximately 174 miles of road open and maintained.	All motorized and non-motorized mechanized travel is prohibited on the Schoheim road (BLM road 41-2E-10.1) and approximately 6 miles of roads will be naturally decommission, 52 miles mechanically decommissioned and 12 miles will be remain under temporary closure. About 3 miles of road will be improved and added to the approximately 171 miles of road open and maintained.

Table S-3. Comparison of Impacts of the Proposed Alternatives

Alternative A	Alternative B	Alternative C	Alternative D
Recreational Use			
Slight negative effect on mechanized vehicle users particularly motorized OHVs as Schoheim road is permanently closed and other roads temporarily closed. No off designated road use by any mechanized vehicle. No allowance for additional roads/trails for mechanized vehicles is slight negative affect as approximately 174 miles currently available. No new hiking trails established is a negative impact. No effect on camping from present situation. No commercial permits established for commercial recreational horseback use thus no effect.	Slight negative effect on mechanized vehicle users particularly motorized OHVs as Schoheim road is permanently closed and other roads temporarily closed or naturally decommissioned. Three mile of road would be re-opened. No off designated road use by any mechanized vehicle. No allowance for additional roads/trails for mechanized vehicles is slight negative affect as approximately 171 miles available. No new hiking trails established and hiking confined in RNAs is a slight negative impact. Moderate negative impact to campers as camping only allowed at Hyatt Lake Recreation complex. No recreational use of horses in the Monument causes moderate negative effect hunters and recreational riders. No commercial permits for commercial recreational horseback use slight negative effect on riders and hunters.	Slight negative effect on mechanized vehicle users particularly motorized OHVs as Schoheim road is permanently closed and other previously closed roads are permanently closed or naturally decommissioned (52 miles).No off designated road use by any mechanized vehicle. Additional roads could be designated for mechanized vehicle use which has a slight positive impact. Allows for new hiking trail designation or construction in the visitor use zone is slight positive effect to hikers. Slight impact to campers as dispersed camping allowed anywhere except RNAs and structures at Box O ranch. Allows recreational horse use (with restrictions) across the Monument except RNAs which is a slight negative effect. Limited permits allowed for commercial recreational horseback use slight positive effect on tourist.	Slight negative effect on mechanized vehicle users particularly motorized OHVs as Schoheim road is permanently closed and other previously closed roads are permanently closed or naturally decommissioned (77 miles). Three mile of road would be re-opened. No off designated road use by any mechanized vehicle. Allows for new designations and new construction for mechanized recreation which is the least restrictive of the alternatives. Allows for new hiking trail designation or construction any where in Monument but RNAs is slight positive effect to hikers. Slight impact to campers as dispersed camping allowed anywhere except RNAs and structures at Box O ranch. Allows recreational horse use (with restrictions) across the Monument except RNAs which is a slight negative effect. Limited permits allowed for commercial recreational horseback use slight positive effect on tourist.
Land Use Authorizations			
Existing authorizations renewed upon request and review relates to minimal effects. No effects on access to private property.	Moderate negative effects to electrical and communication industry as no new application accepted. Only existing permits renewed. No effects on access to private property.	Moderate negative effects to electrical and communication industry as no new application accepted. Only existing permits renewed. No effects on access to private property.	Slight positive effects to electrical and communication industry as new application accepted for facilities at existing sites. No effects on access to private property.
Minerals			
Negligible effects as mineral potential of area low. Approved projects would have to mitigate potential damage to aquatic resources, stream channels, and riparian habitat. If mitigation was not possible, the project would not be approved.	Negligible effects as mineral potential of area low. Potential adverse environmental impacts associated with extraction of common mineral varieties from inside the Monument would be avoided under this Alternative.	Negligible effects as mineral potential of area low. Approved projects would have to mitigate potential damage to aquatic resources, stream channels, and riparian habitat. If mitigation was not possible, the project would not be approved.	Negligible effects as mineral potential of area low. Approved projects would have to mitigate potential damage to aquatic resources, stream channels, and riparian habitat. If mitigation was not possible, the project would not be approved.

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CHAPTER 1
PURPOSE AND NEED FOR THIS DOCUMENT

Introduction

The Cascade-Siskiyou National Monument (CSNM) was established on June 9, 2000 when President William J. Clinton issued a Public Proclamation (Appendix A) under the provisions of the Antiquities Act of 1906 (Appendix B). This Draft Resource Management Plan/Draft Environmental Impact Statement (DRMP/DEIS) (also referred to as the Plan or Proposed Plan) provides possible management strategies that achieve the vision and goals pursuant to the Proclamation. The CSNM was created to protect an array of biological, geological, hydrological, archeological and historic objects. Although important individually, collectively these objects in the context of the natural environmental processes comprise a unique, diverse ecosystem. These ecological processes and/or the individual components will be referred to as "Monument objects", "Monument resources" or "Monument values" throughout this document.

The Proclamation, which is the principal direction for management of the CSNM, clearly dictates that the Bureau of Land Management (BLM) manage the Monument "to protect the objects identified." All other considerations are secondary to that edict. The guiding principle for management of the CSNM is to protect, maintain, restore or enhance relevant and important object(s). The Proclamation provided specific management direction and, thus, the alternatives presented in this draft Plan are necessarily constrained to those resources affording required protection. As a result, the range of alternatives presented in this planning document for the CSNM is narrower than typical BLM resource management plans.

The Proclamation governs how the provisions of the Federal Land Policy and Management Act (FLPMA) of 1976, as amended, will be applied within the CSNM. FLPMA directs the BLM to manage public land on the basis of multiple use and "in a manner that will protect the quality of scientific, scenic, historic, ecological, environmental, air, and atmospheric, water resource, and archeological values." The term "multiple use" refers to the "harmonious and coordinated management of the various resources without permanent impairment of productivity of the land and the quality of the environment." Multiple use involves managing an area for various benefits, recognizing that the establishment of land use priorities and exclusive uses in certain areas are necessary to ensure that multiple uses can occur harmoniously across the landscape.

The Proclamation, FLPMA, and other mandates provide the direction for the preparation of this resource management plan. Within this guidance, many decisions remain about how best to protect, maintain, restore or enhance relevant and important resources within the CSNM and address major issues surrounding Monument management. The Presidential Proclamation directed the Secretary of the Interior to prepare a plan in order to begin making those decisions. The Plan will guide management activities on BLM administered land within the CSNM and allow for the protection and use of its resources.

This Draft Resource Management Plan/Draft Environmental Impact Statement (DRMP/DEIS) will address all but one management activity for BLM administered land within the CSNM. This Plan will not address management activities related to livestock grazing. The Presidential Proclamation directed the Secretary of the Interior to "study the impacts of livestock grazing on the objects of biological interests in the Monument with specific attention to sustaining the natural ecosystem dynamics." The Draft Study of Livestock Impacts on the Objects of Biological Interest in the Cascade-Siskiyou National Monument (USDI 2001) was published in April, 2001. After the Draft Study

Plan is peer reviewed and the public has an opportunity to submit comments, it will be finalized and fully implemented. Should grazing be found to be incompatible with protecting the objects of biological interest, the BLM will amend or retire the grazing allotments pursuant to the processes of applicable law. The results of the grazing study plan and management activities related to livestock grazing will be addressed through a resource management plan amendment. This amendment would be completed after the initial findings of the grazing impact study.

The CSNM Resource Management Plan will achieve the goals of balancing resource use and protection in a manner that creates opportunities for public exploration and education, provides for progressive land stewardship, incorporates input from the scientific community and the public at large, and reflects the regional significance of CSNM resources. The results of the CSNM planning process to date are presented in this Draft Resource Management Plan/Draft Environmental Impact Statement (DRMP/DEIS).

The Cascade-Siskiyou National Monument consist of 52,947 acres of federal land administered by the Bureau of Land Management and 4 acres administered by the Bureau of Reclamation within the boundary established by the Presidential Proclamation (map 1). The land administered by the Bureau of Reclamation is used solely for canal purposes to transport water from Howard Prairie Reservoir to Keene Creek Reservoir and will not be addressed in the Plan. This draft Plan is specific to the Cascade-Siskiyou National Monument. The management of non-federal land adjacent to the CSNM land is not addressed.

Relationship of the DEIS to BLM Policies, Programs, and other Plans

The Cascade-Siskiyou National Monument was established as a new planning area independent of other BLM-administered lands, this DRMP/DEIS meets requirements of the Bureau's regulation for Resource Management Planning found in 43 Code of Federal Regulations 1610 as a stand alone document and is not tiered to any previously written resource management plan. A land use allocation change occurred as a result of the establishment of the CSNM. This reallocation of land within the BLM Medford District requires a resource management plan amendment to the fully approve and implement. Although this document is an independent DRMP/DEIS for the CSNM, the analysis and decision making process will also meet requirements of the Bureau's regulation for RMP amendments found in 43 Code of Federal Regulations 1610.5-5 in order to amend the Medford District's RMP. Since the authority to approve RMPs (and RMP amendments) cannot be re-delegated to the field or district manager levels, this DRMP (and any proposed changes in the Medford District's RMP) must be elevated to the OR/WA State Office for review and approval by the State Director.

In 1998, BLM Medford District completed a record of decision (ROD) for its *Integrated Weed Management Plan* (EA OR-110-98-14) which was tiered to the *Northwest Area Noxious Weed Control Program EIS* (March 1987). This DEIS is tiered to that EA and decisions made in that ROD are not readdressed in this document.

This DEIS is tiered to BLM's 1989 *Western Oregon - Management of Competing Vegetation EIS* for analysis of impacts of vegetation management activities on human health, and all other impacts from the use of herbicides, in management programs other than noxious weed control. The decisions made in that ROD are not readdressed in this document.

This DEIS is tiered to the Environmental Impact Statement and Record of Decision for the *BLM Oregon Wilderness Study* Report of October 1991.

Although not directly tiered, this DEIS referenced the Medford District's Record of Decision/RMP (USDI 1995a) and the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl (USDA 1994b) for insuring planning consistency with adjacent federal land.

Planning Process

The target date for completion of the CSNM Resource Management Plan is 2003. To meet this objective, an inter-disciplinary planning team was formed in the Fall of 2000 to begin this inclusive planning process designed to guide CSNM management for the next decade.

The purpose of this plan is to provide both a set of decisions outlining management and to create a framework for future planning and decision-making. Its scope is necessarily broad, since it is a general framework document that will guide the overall management of activities within the CSNM, as well as the protection and use of Monument resources. It is anticipated that this resource management plan will be amended once sufficient data from the study of livestock grazing impacts is made available. The plan amendment would mainly address livestock grazing issues and related activities but other issues may arise as a result of monitoring that could also be addresses.

It is expected there will be a future need for subsequent and more detailed planning which will focus on specific resource management issues and implementation of management direction set forth in this Plan. Further National Environmental Policy Act (NEPA) documents will be written to address and implement decisions from this Plan that are not fully defined and/or analyzed (e.g., vegetation management and prescribed fire treatments). In each subsequent activity plan and NEPA document, the BLM will include a description of the desired future condition of the land and resources involved, and will explain how the proposed activities would contribute to attaining the desired future condition. At that time the BLM will conduct all surveys and clearances necessary to implement the plan. Some activities such as road maintenance, closures, decommissioning, or improvements may be implemented without further planning as the detail and analysis from this Plan may be adequate. Implementation of these activities may occur once required surveys are completed and a determination of NEPA adequacy is fulfilled.

Scoping Process

The first step in the planning process was to invite public participation. This "scoping" process invited a wide range of public comment(s) to identify relevant, substantive issues to be addressed in the Plan. The formal scoping period began with publication of the Notice of Intent to produce a Management Plan, which appeared in the Federal Register on July 31, 2000 (Volume 65, No.147, Pg. 46731). Written comments were accepted through August 31, 2000. Although the original intent was to supplement the Cascade Siskiyou Ecological Emphasis Area (CSEEA) Draft Management Plan/ Environmental Impact Statement (DMP/DEIS), it became clear that a "stand alone" CSNM Resource Management Plan would better serve the public.

The scoping process invited public input through a letter, sent to adjacent landowners and interested parties, announcing the establishment of the Monument and detailing the planning process. In addition, the CSNM web page provided up to date information on the Monument and solicited public input. All relevant information received during the comment period for the CSEEA DMP/DEIS was incorporated in the planning process. A complete outline of the scoping process is found in Chapter 5.

Issues

The purpose of the scoping process was the identification of relevant, substantive issues to be addressed in the Plan. For planning purposes, an "issue" is defined as a matter of controversy, dispute, or general concern over resource management activities, the environment, or land uses. In essence, issues help determine what decisions will be made in the Plan and what the environmental analysis must address (via an EIS, as required by NEPA).

Based on scoping comments received and subsequent analysis and evaluation, major planning issues were identified. Those issues are listed below with a short description of why each is significant, as well as decisions regarding each issue that must be made in the plan. In addition to the issues identified in scoping, the proposed Plan will address basic environmental and management issues including native plant communities, wildlife habitat, access, recreational opportunities, off-highway vehicle use, special forest products, water quality and visitor use.

Issue: Livestock Grazing

Livestock grazing is an issue of great concern, since many of the scoping comments included this issue. Many expressed concern over the adverse effects of grazing for the ecology of the area; often mentioning the costs of government subsidy of ranchers. Others supported retaining grazing practices, feeling that the proposed plan threatens their livelihood and way of life. This group views grazing to be a management tool for preventing fires and enhancing wildlife habitat.

This document will only address the current condition of livestock grazing and identify substantiated effects of livestock grazing to Monument resources. Livestock grazing management will not be addressed in this Plan. The Presidential Proclamation directed the Secretary of the Interior to "study the impacts of livestock grazing on the objects of biological interests in the Monument with specific attention to sustaining the natural ecosystem dynamics." The Draft Study of Livestock Impacts on the Objects of Biological Interest in the Cascade-Siskiyou National Monument (USDI 2001) was prepared in April, 2001. The results of the grazing study plan and management activities related to livestock grazing will be addressed through a resource management plan amendment to be issued once sufficient data is collected.

Issue: Access and Transportation System

Roads are seen as having a detrimental effect on land, water quality, wildlife and human experience (e.g., noise). Erosion issues are often raised. Some recommend decommissioning all non-residential roads and jeep trails and restricting of off-road vehicle use. Other comments requested maintaining access for recreation and fire suppression. There was some concern that this Plan would discriminate against young, old and handicapped who require motorized-vehicle access for enjoying the area. The Schoheim Road was mentioned often, both in regards to degradation and its importance for access. The Presidential Proclamation closed Schoheim road to mechanized vehicles except for emergency or authorized administrative purposes. The Proclamation also prohibits off-road travel by mechanized vehicles. This Plan will address access of the CSNM through proposed transportation management objectives.

Issue: Timber Harvesting

Most oppose commercial timber harvesting due to adverse ecological effects. Others cite the importance of allowing some level of logging such as selective harvesting to provide jobs and reduce fire hazard. The Presidential Proclamation prohibits commercial harvest of timber except when part of an authorized science-based ecological restoration project aimed at meeting protection and old-growth enhancement objectives. The Plan does address the protection and enhancement of old-growth coniferous forest habitat and some of the proposed management actions include commercial harvesting activities.

Issue: Special Forest Products

The management of special forest products such as mushrooms, grasses, Christmas trees and firewood was an issue raised and is addressed in this Plan.

Issue: Unique Natural and Biological Values

A number of people cite the importance of CSNM for its unique biological character, mentioning its diversity and fragility. Wildlife, native plants and insects (butterflies) were often mentioned, as were water quality and fish. Many were concerned about the spread of noxious weeds and further degradation of fragile meadows. The Plan does address the management of native plant communities including the control of weeds and the protection of special status plant and animal species.

Issue: Fire

Concerns are expressed across groups about fire suppression, including limited road access, and ability to introduce fire and develop adequate fire planning. Wildfire suppression and the possible use of prescribed fire to achieve ecological objectives is addressed in the Plan.

Issue: Collection of Gems and Minerals

Comments were received about the opportunity to collect specimens, such as Agates, for private collections and museum exhibits. The Plan will address this issue as part of the management of Special Forest Products.

Issue: Private Property

Concerns about government control are expressed by those opposed to the creation of the CSNM. Issues are regulations and "taking" of private property, local autonomy, rights-of-way grants, lack of respect for way of life and livelihood. There is particular concern over the often implied assumption that public land policies are transferable and even desirable for the surrounding private lands. Many see the CSNM as a means to address the issue of habitat fragmentation and to enhance connectivity by acquiring private holdings from willing landowners. Although many respondents thought the size of the area needs to be expanded significantly, the size of the CSNM is not to be addressed in this Plan. The CSNM designation applies only to federally managed land and is subject to valid existing rights. Valid existing rights are addressed in the Authorized Uses section (Chapter 2) of the document with a list of authorized uses in Appendix P. Those with reciprocal rights-of-way are addressed in the Transportation section (Chapter 2). The external boundary depicted on the CSNM Analysis Area map (map 1) is for planning purposes only. Privately owned property within this outer boundary is not encumbered by CSNM designation, proposed land use allocations or management guidelines in this Plan.

Issue: Hiking and Non-Mechanized Recreation

Maintaining opportunities for enjoying the area for hiking and other forms of recreation was requested. Among the benefits expressed are aesthetic and spiritual values, education opportunities, and economic benefits from recreation. Some commented that enhanced trails would benefit citizen management and monitoring. All of these issues are addressed in this Plan.

Issue: Public Involvement

Comments were received about local citizen's role in the management of the Monument. Some thought that a partnership should be formed and others recommended resident stewardship as a method of implementing management activities. Although this Plan does not address public involvement beyond that required by NEPA, the intent is to initiate and facilitate public involvement related to future management of the CSNM.

Other Issues

Issues and Questions developed by Local Government Officials

During the scoping period, Sue Kupillas, Jackson County Commissioner, requested a meeting to help clarify issues and concerns she and some of her constituency had concerning the Monument Designation and the planning process. A list of questions resulting from the meeting along with answers prepared by the BLM are included for informational purposes (Appendix I I).

Management Common to all Alternatives

Other important issues were raised during scoping which are of concern to the public, but which specific management direction as a result of the Presidential Proclamation, have been adequately addressed in other NEPA documents, are governed by existing laws and regulations or the scope is so narrow that alternatives to management is not appropriate. Because management of these issues has already been determined, alternatives for those issues are not presented in this Plan. The management of the following issues are discussed in further detail in the "Management Common to All Alternatives" section in Chapter 3.

- Aquatic Habitat
- The Soda Mountain Wilderness Study Area
- Wildfire Suppression Activities
- Special Use Activities
- Snags and Coarse Woody Debris
- Fish and Wildlife by the State of Oregon
- The Pacific Crest National Scenic Trail
- Special Status Plants and Animals
- Noxious Weeds
- Air Quality
- Archaeological Sites
- Hyatt Lake Recreation Complex
- Visual Resources
- Off-Highway Vehicles
- Livestock Grazing

Issues, Actions and Alternatives Considered but Eliminated

There were a few management alternatives suggested during scoping which were eliminated from detailed analysis because they were not deemed reasonable given the guidance of the Proclamation or for other reasons. Those alternatives, and reasons they were eliminated, are discussed in the "Alternatives Considered But Eliminated From Detailed Analysis" section at the end of Chapter 3. They include:

- Expanding the WSA boundary
- Predominant Recreation Development
- Eliminating Prescribed Fire

Development of Management Strategies and Alternatives

Defining the planning issues was the first step in narrowing the scope of possible actions that would be carried forward in the planning process. The planning team then developed management strategies aimed at providing viable options for addressing the planning issues. The management strategies provided the building blocks from which the general management scenarios, and eventually, the more detailed alternatives, were developed. The result of this process is the range of management alternatives provided in this Draft Resource Management Plan/Draft Environmental Impact Statement (DRMP/DEIS).

Summary of Planning Criteria and Considerations

The process described above was designed to identify a viable range of management alternatives given the comments and issues identified during public scoping. At the same time, the legal requirements and directives governing the planning process were considered in determining the range of management alternatives and in developing the framework for the DRMP/DEIS. The following is a summary of key planning considerations:

The Presidential Proclamation (Proclamation 7318 of June 9, 2000)

The Proclamation (Appendix A), enacted under the Antiquities Act of 1906 (Appendix B), established the CSNM, described the purposes of the CSNM, and made certain provisions for its management, including:

- Federal lands within the Monument are withdrawn from all forms of entry, location, selection, sale or leasing related to minerals or geothermal resources.
- Federal lands within the Monument boundary will remain in public ownership, unless exchanged for lands that would further protect Monument resources.
- Establishment of the Monument does not enlarge or diminish the jurisdiction of the State of Oregon with respect to fish and wildlife, including regulation of hunting, trapping and fishing, on Federal lands with the Monument.
- Livestock grazing may continue with appropriate terms and conditions under existing laws and regulations pending the outcome of a study of livestock grazing impacts on the objects of biological interest in the Monument with specific attention to sustaining the natural ecosystem dynamics.
- Valid existing withdrawals, reservations, or appropriations are not revoked by the Proclamation, but such uses must be managed to protect Monument resources.
- All motorized and mechanized vehicle use off road is prohibited except for emergency or authorized administrative purposes.
- The commercial harvest of timber or other vegetative material is prohibited except when part of an authorized science-based ecological restoration project aimed at meeting protection and old growth objectives. Removal of trees from within the Monument may take place only if clearly needed for ecological restoration and maintenance or public safety.
- Subject to valid existing rights, the reservation of a quantity of water sufficient to fulfill the purposes for which the Monument is established.

Federal Land Policy and Management and National Environmental Policy Acts

The development of this management plan is guided by the legal authority found in the Federal Land Policy and Management Act (FLPMA) of 1976, as amended, and the National Environmental Policy Act (NEPA) of 1969, as amended. In developing land use plans, FLPMA and NEPA require that the BLM use an interdisciplinary approach and provide opportunities for public involvement and interagency coordination. In addition, FLPMA requires land use plans:

- Give priority to the designation and protection of Areas of Critical Environmental Concern (including Research Natural Areas)
- Consider the present and potential uses of public lands
- Consider scarcity of values involved
- Rely on public land inventories
- Comply with pollution-control laws
- Manage Wilderness Study Areas to ensure that their potential wilderness values are not impaired

Both NEPA and FLPMA require BLM to provide the public with information about the effects of implementing land use plans.

Since the passage of FLPMA, an area now within the CSNM was recommended for wilderness review. This area, the Soda Mountain Wilderness Study Area (WSA), has been managed under the BLM's Interim Management Policy and Guidelines for Lands Under Wilderness Review (IMP) (BLM Manuel H-8550-1) since it was identified. The objective of the IMP is to manage those lands so as not to impair their suitability for designation as wilderness. The Soda Mountain WSA will continue to be managed under the IMP, and the CSNM Plan will only be implemented to the extent that it does not conflict with the IMP, unless action is taken by Congress. If Congress decides not to designate any WSA lands as wilderness, those lands would then be managed under the provisions of the CSNM Resource Management Plan.

Oregon and California (O&C) Act of August 28, 1937

There are approximately 40,180 acres of O&C lands in the Monument. The Presidential Proclamation establishing the Monument states "Nothing in this proclamation shall be deemed to revoke any existing withdrawal, or appropriation; however, the national monument shall be the dominant reservation." The Proclamation also states "The Secretary of the Interior shall manage the monument through the Bureau of Land Management, pursuant to applicable legal authorities (including, where applicable, the Act of August 28, 1937, as amended (43 U.S.C. 1181a-1181j)), to implement the purposes of this proclamation." The O&C Act of August 28, 1937 requires the Secretary of the Interior to manage O&C lands for permanent forest production, however, such management must also be in accordance with sustained-yield principles. Further, the Act requires that management of O&C lands protect watersheds, regulate streamflow, provide for recreational facilities, and contribute to the economic stability of local communities and industries. Lands administered under the O&C Act must also be managed in accordance with other environmental laws such as the Endangered Species Act and the Clean Water Act. Some provisions of these laws take precedence over the O&C Act and, in accordance with the Proclamation, the Monument is the dominant reservation. The CSNM Proclamation does not change the O&C status of the land, it simply withdraws it from all forms of entry or disposal under mining, land and mineral leasing laws and removes the timber volume within the CSNM from the BLM Medford District's sustainable harvest levels calculations.

Planning Criteria

In addition to planning considerations of FLPMA, BLM planning regulations (43 CFR 1610) require preparation of planning criteria to guide the development of all resource management plans. Planning criteria ensures that plans are tailored to identified issues and ensure that unnecessary data collection and analysis are avoided. Planning criteria are based on applicable laws, agency guidance, public comments, and coordination with other Federal, state and local governments, and Native American tribes.

The planning criteria used in developing the Cascade-Siskiyou National Monument Resource Management Plan are as follows:

- The Plan will be completed in compliance with FLPMA and all other applicable laws.
- The CSNM Planning Team will work cooperatively with the State of Oregon, tribal governments, county and municipal governments, other Federal agencies, and all other interested groups, agencies and individuals.
- The Plan will establish the guidance upon which the BLM will rely in managing the CSNM.
- The planning process will include an Environmental Impact Statement that will comply with National Environmental Policy Act standards.
- The Plan will emphasize ecological and historic resources of the CSNM. It will also identify opportunities and priorities for research and monitoring related to the key resource values for which the CSNM was created.
- The Plan will recognize valid existing rights within the CSNM. The Plan will also outline the process the Bureau of Land Management will use to address

applications or notices filed after the completion of the Plan on land use authorizations.

- The Plan will recognize the State's responsibility to manage hunting, trapping and fishing within the CSNM.
- The Plan will address transportation and access, and will identify where better access is warranted, where access should remain as is, and where decreased access is appropriate to protect CSNM resources and manage visitation.
- The Plan will identify plant communities and address their health, protection and possible restoration.
- The Plan will set forth a framework for managing recreational activities to provide for enjoyment of visitor experiences consistent with the ecological objectives of the key resource values.

Significant Decisions Proposed In the Plan

This CSNM Draft Resource Management Plan/DEIS provides a broad array of decisions concerning major resource issues, especially in the action alternatives (Alternatives B, C, and D). The decisions vary among the respective alternatives, and their level of specificity also differs. As in the case of any resource management plan, it is expected that subsequent activity planning will occur, consistent with the guidance included in this Plan, in order to make decisions on individual activities. For example, this could include the management of outfitter and guide services in a given area or provision for a designated hiking trail system. The most significant areas in which this plan offers decisions within the CSNM include:

- Plant Community Health
- Access and Transportation System
- Hiking/Non-Mechanized Recreation
- Visitor Use
- Special Forest Products
- Mechanized Recreation
- Recreational Animal Stock Use
- Facilities/Rights-of-Way

What's next in the Planning Process

Availability of this Draft Resource Management Plan/DEIS was announced in the Federal Register and in local media. Publication of the Notice of Availability opens a comment period for the public to submit written comments on this Draft Plan. During this period, public meetings will be held in locations and times announced in the letter accompanying this document and in local media.

After analysis and consideration of public comments on the DRMP/DEIS, the CSNM Proposed Resource Management Plan/Final Environmental Impact Statement is expected to be released in the Fall of 2002. The Approved CSNM Resource Management Plan/ROD is expected to be completed by 2003.

CHAPTER 2 – AFFECTED ENVIRONMENT

This chapter contains descriptions of existing physical, biological, cultural, social, and economic resources, processes and characteristics of the Cascade-Siskiyou National Monument (CSNM). Descriptions of these resources and processes will serve as the baseline for the analysis and determination of the effects of the proposed alternatives on the existing environment. These resource descriptions are discussed only in the detail needed to analyze the known effects of the plan implementation. The affected environment is described according to the various resources, processes, and uses in the Monument.

Monument Setting

The Cascade-Siskiyou National Monument (CSNM) consists of 52,947 acres of federal land located in southern Jackson County, Oregon (map 1). The CSNM is located in the Klamath and Rogue River basins and four watersheds that have a combined total of approximately 780 miles of streams. The topography of the CSNM is variable with the area around Agate Flat being nearly level to slopes in excess of seventy percent along the headwalls of creeks in the Klamath River-Iron Gate watershed. Elevation ranges from 2,400 feet along Emigrant Creek to 6,134 feet at the top of Chinquapin Mountain. Average annual precipitation for this area ranges from 24 to 46 inches with most coming in the form of rain below 3,500 feet and snow above that level.

The CSNM is noted for its biological and ecological diversity because of its location at the confluence of the Siskiyou range of the Klamath Mountains, Cascade Mountains and the Great Basin Geological Provinces. Each geological province providing its own special assemblage of organisms and ecological processes known as ecoregions which are based on geology, climate, soils, flora and fauna, elevation, and land use. There are three ecoregions identified in the CSNM having particular biological significance in terms of species richness, endemism, and unique evolutionary/ecological phenomenon (map 3).

Archaeological evidence indicates that people have lived in the region for at least 10,000 years. Human populations were very low in numbers and highly mobile until about 7,000 years ago. Various native peoples inhabited or used the CSNM area including the Shasta, the Klamath and Modoc tribes. Euro-American settlement in the Rogue and Shasta valleys from the 1850s on spurred the development of a new way of life in the region. Farmers and ranchers began to transform the land. Cattle and sheep ranching became a significant use in the CSNM during the latter half of the nineteenth century. Livestock grazing of cattle on an allotment basis continues today across the Monument with authorized active use of approximately 3,754 animal unit months (AUMs).

Logging became more important in the area now identified as the CSNM after the development of transportation routes, such as the railroad in the 1880s. Large scale salvage logging, partial harvests, and selective logging began in the 1940s. Logging continued through the 1980s with clearcutting being the preferred harvest method. In the 1990s, timber harvest levels significantly decreased in the area now designated as the CSNM although approximately 83 percent of the coniferous forest has a timber harvest history.

There are approximately 470 miles of road on approximately 85,173 acres of land across all ownerships associated with the CSNM. Of this total, the BLM controls approximately 251 miles of road that accesses the 52,947 acres of public land designated as the Monument. These roads provide access for recreation, private property and management activities such as wildfire suppression.

The majority of the CSNM is in a moderate to high fire hazard as a result of past vegetation management and suppression activities. Fire has played an important role in influencing historical ecological processes and continues to be recognized as playing an important role in the development and maintenance of vegetative diversity in fire prone ecosystems found throughout the CSNM. Prescribed fire is a tool which could be used to lower fire hazards and meet objectives for vegetative communities within the CSNM.

Land Ownership

The Cascade-Siskiyou National Monument covers 52,947 acres of federal land in southwest Oregon (map 1). These federal lands are managed by the Bureau of Land Management's Medford District Office. Although there are approximately 32,222 acres of non-federal lands interspersed among the federal land within the Presidential Proclamation boundary (map 1), the Cascade-Siskiyou National Monument is comprised of only federal land (map 2). The description of the affected environment may include non-federal land because natural resources such as soil, water, and vegetation are often evaluated on a landscape basis. This does not infer that non-federal lands would be managed according to this Plan. This Cascade-Siskiyou National Monument Resource Management Plan only affects the 52,947 acres of federal land.

Ecological Processes and Landscape Health

The ecological and biological importance of the Cascade-Siskiyou National Monument has long been recognized (Carroll and others 1998, Detling 1961, Nelson 1997, Prevost and others 1990). The establishment of the CSNM recognizes the high biological species and plant community richness of the area.

Much of this richness is due to the Monument's geographical location at the meeting of the Cascade, Klamath and Eastern Cascade Slope Ecoregions (Pater and others 1997a) and their subdivisions, the Klamath River Ridges and Siskiyou Foothills (Klamath Ecoregion), Southern Cascades (Cascade Ecoregion), and the Southern Cascade Slope (Eastern Cascade Slope Ecoregion) (map 3). Ecoregions should not be confused with Geological Provinces which are based strictly on geological criteria. Ecoregions are delineated on the basis of geology, climate, soils, flora and fauna, elevation, and land use. Each ecoregion brings its own special assemblage of organisms and ecological processes to the Monument landscape. Of major importance is the role that the CSNM plays in contributing to the biological and ecological significance of the Klamath Ecoregion.

Several recent papers describe unique aspects of the Klamath-Siskiyou region of northwestern California and southwestern Oregon to the west of the CSNM. DellaSala and others (1999) describe the Klamath Siskiyou Bioregion (similar to an Ecoregion) as being of particular biological significance in terms of species richness, endemism, and unique evolutionary/ecological phenomenon, as compared to other temperate coniferous forests.

Coleman and Kruckeberg (1999) describe the dynamic plate tectonics of the Klamath-Siskiyous, and the mixing of igneous, metamorphic, and sedimentary geological formations that resulted in the diverse lithologies and soils of the Bioregion. Coupled with periods of geological isolation and a range of environmental conditions, the complex history of the area has resulted in a rich array of plant communities which has attracted the interest of ecologists of the caliber of Robert Whittaker, Richard Waring, Leroy Detling, Frank Lang, and Arthur Kruckeberg as well as local nature lovers.

Landscape Criteria

Evolution, long term climatic change, and geological phenomena (vulcanism, mass wasting, erosion) operating across geological time continue to contribute to the high biological and ecological richness of the area. However, the emerging science of landscape ecology identifies several landscape criteria, such as connectivity and habitat fragmentation, that strongly effect the biological integrity of the CSNM in the short-term.

Many have commented (Carroll and others 1998, DellaSala and others 1999, Noss and Cooperrider 1994) of 'connectivity', implying the need to preserve and facilitate the habitat continuity necessary for the dissemination and longer term migration of rare plants, plant communities and wildlife dependent on late seral conifer communities. This section uses late seral conifer continuity as a substitute for the concept of connectivity. Spatial habitat requirement information for all organisms (rare or otherwise) across the landscape (implied by the definition of connectivity) is lacking. Conifer continuity implies present and potential habitat for conifer community dwelling organisms not adapted for long range dispersal (measured in miles), as coarsely identified by satellite imagery or potential vegetation based on USDA (1993) soil types. Regional satellite imagery shows the area of conifer continuity between the Cascade and Klamath mountains (and ecoregions) across the Siskiyou range north of the Rogue/Klamath Divide (map 4). However, the I-5 corridor, numerous roads, and timber harvest within and beyond the bounds of the CSNM all represent disruptions in the late-seral conifer continuity. Dispersal habitat for Northern Spotted Owls reflect this pattern (map 28).

Habitat Fragmentation - "the breakup of extensive habitats into small, isolated patches that are too limited to maintain their species stocks into the indefinite future" are an associated form of landscape degradation which could lead to species loss and favor weed invasion (Meffe and others, 1997). Surveys of rare plants have identified threatened and endangered species within the CSNM. Halpern and Spies (1995) studied species diversity in natural and managed forests of the Pacific Northwest. They found that few understory species were restricted to, or absent from, a particular seral stage. However, a majority of plant species showed greatest abundance in old-growth. Conversely, Jules and others (1999) found some plant and wildlife species more closely associated with particular seral stages, including clearcut areas and old-growth remnants. However, both groups favored the maintenance of spatial and temporal diversity for maintaining plant species diversity.

Ecosystem processes and interaction, such as frequency, severity and size of disturbances, are all important criteria in characterizing disturbance. The altered nature of the CSNM landscape is clearly indicated by recognizing that timber harvest, rather than fire, has become the dominant landscape-level disturbance process. High elevation white fir forest communities where root rots are the historical disturbance factor is the exception. The present frequency and size of timber harvest units could be postulated to be similar to historical conditions caused by fire. Patterning and severity (except for white fir plant communities) are substantially changed. Present patterning follows landownership boundaries and remains rigid through time. Timber harvest units tend to disregard topography and often are of similar size (Sections). Past timber harvest on private and public land was frequently stand replacement clearcuts with the removal of the larger, older trees, while historical underburns left larger, older trees.

Current management objectives within the coniferous forest of the CSNM include facilitating and maintaining late-successional (late seral) and old-growth habitat. However, the existing checkerboard pattern of federal land ownership of the CSNM coupled with short harvest rotations on private land have interrupted late seral conifer continuity. Timber harvest on private lands frequently approximates a stand replacement event. Such events were probably not uncommon in mixed conifer communities in the recent historical past. During pre-European times, however, stand replacement by fire usually occurred as isolated patches within a larger area of underburns. At present, where fire escapes suppression, deforested patch size is larger than during historical times, and fires are characterized as stand replacement rather than an underburn (Agee 1998). Fragmentation is greater now than during recent historical times. A greater portion of the landscape is currently acutely disturbed and edge effects and recovery times to attain mature trees have increased due to increased stand replacement events (clearcutting, and intense wildfire).

While little is known of the genetic variability within and between populations of isolated organisms, further fragmentation could be a threat to the continued persistence of isolated late-successional conifer organisms (Jules and others 1999). Climatic edge effects may also impact the persistence of high canopy conifer community associated plants and wildlife if patch size is too small. Ecologists commonly buffer disturbed areas by tens to hundreds of feet to correct disturbance edge effects on habitat availability of organisms adapted to conditions within the stand.

Map 5 illustrates the cumulative acute surface impacts on the landscape (woody overstory removal and altered ecosystem functioning by processes other than fire) derived from aerial photos (1939, 1953, 1974, 1996), known roads and OHV trail locations, and other areas altered relative to historical condition. All roads, OHV trails, areas of tree overstory removal, pasture creation, and known weed impact were buffered by 100 meters, as an average impact distance for the range of organisms found in our landscape. Table 2-1 indicates that all coarse plant communities have been severely impacted in the past 50 years.

Semi-wet meadows show the highest percent acute disturbance, while grasslands, shrublands, and woodlands show low acute disturbance (CSNM plant communities are described in the Vegetation Section). The percentages in Table 2-1 are conservative estimates. Many conifer areas not showing acute disturbance in the past 50 years have been selectively logged. Also, the effects of long-term grazing and fire suppression were not included as acute disturbance. Note that the more highly fire-dependent

Table 2-1. Percentage Acute Disturbance for Plant Communities with Available Data

Plant Community	Percent Acute Disturbance
Grassland	50.8
Shrubland	41.7
Woodland	45.2
Mixed Conifers	80.3
White Fir	81.6
Semi-wet meadows	90.5
Wet meadows	82.8

grasslands, shrublands, and woodlands plant communities, are considered endangered and at highest risk of loss due to fire exclusion. This discussion and Table 2-1 indicates that the CSNM landscape is considerably altered when compared to historical conditions.

Calculations of the area covered by different plant communities across the CSNM landscape indicate the relative importance of plant communities as refugia for plants and animals (see Table 2-18). Some of the rarest plant communities (semi-wetlands and wetlands) have been particularly impacted by historical livestock management within the CSNM landscape. Wetlands and semi-wetlands are also of particular importance as specialized habitat and as a wildlife water source.

While much of this discussion implicates the spatial integrity of conifer plant communities, isolated stands of conifers embedded within other plant communities also serve an important ecological function across the landscape as stepping stones for more widely dispersed species. Such island habitats may also constitute areas of speciation, and contribute to the genetic diversity of organisms across the landscape. The CSNM contains several such conifer islands on the southerly facing slopes south of Keene Creek Ridge and the Rogue/Klamath Divide moving from high elevation downwards towards the California border. While several of these stands have been impacted by timber harvest, all contribute to habitat diversity. These stands frequently have distinct tree assemblages, such as the old-growth mixed conifer stands with dominant sugar pine within the Oregon Gulch RNA. However, most of these isolated stands bear the consequences of fire exclusion in the form of dense understories of Douglas-fir and white fir.

Other ecological processes that could be considered at the landscape scale, but are described at the community level of biological organization within this chapter, include changes in dominant species, species range extension/contraction, weed invasion, and tree pathogen proliferation.

Cultural Resources

Historical Use

Cultural resources include the physical remains of an area's past human use, as well as those areas which are significant for traditional cultural uses or spiritual practices. A region's cultural history is essential to understanding and predicting the cultural resources within it, and to define the human interactions with the land which have contributed to the condition of the current environment. Cultural resources in the CSNM are managed under various federal laws and regulations, and by those management plans or actions that apply within it. Cultural resource laws also define the importance of tribal consultation when developing management plans that involve areas in which tribes have an interest. This section provides a brief cultural history as a background for the discussion of the cultural resources found within the CSNM, and discusses existing management concerns specifically pertinent to cultural resources.

Archaeological evidence indicates that people have lived in the region for at least 10,000 years. During that time people derived their material needs from the physical environment by hunting, gathering and fishing.

Human populations were very low in numbers and highly mobile until about 7,000 years ago. After that time populations increased in size, and regular camps appeared in the archaeological record. For the next 5,000 years the people of this region lived in small bands, moving seasonally across the landscape in search of resources, in increasingly well-defined group territories. By 2,000 years ago, however, a new way of life was well-established.

The new way of life was characterized by larger populations, well-defined group territories, and a higher degree of sedentism than existed previously. Permanent villages, occupied annually for at least part of the year, appeared along the Klamath and along major tributaries to the Rogue River. Inhabitants of these villages still followed a seasonal regime, hunting and gathering in the uplands as game and resources became available. Populations continued to grow, and group interactions intensified, as indicated by an increase in regional trade and warfare. Social hierarchies developed, with wealth items representing higher status among individuals of families. This way of life continued until contact with Euro-Americans in the nineteenth century.

Various native peoples inhabited or used the CSNM area at the time of contact. The Shasta had numerous villages along the Klamath River north of the Shasta Valley, and also occupied the southern end of Bear Creek Valley in the Rogue River Basin. Members of the Klamath and Modoc tribes, situated mainly to the east in the Klamath Basin, may have used the eastern part of the CSNM (Agate Flat, Jenny Creek) for various purposes. The Takelma of the Rogue Valley may also have used the uplands in the northern part of the CSNM. All of these groups followed a traditional way of life in which relations to the natural world and to each other were encoded in myth and maintained by rituals. For these tribes, certain plants, animals, and places on the land had inherent spiritual qualities.

There were numerous resources upon which these native peoples depended. Roots and bulbs, such as camas (*Camassia*) and various forms of *Perideridia* (e.g. ipos, yampa) provided starchy staples as did acorns from oak trees. Fish, deer, elk, and small mammals provided staple proteins, augmented by a wide variety of berries, nuts, seeds (e.g. tarweed seeds, *Madia* spp.). Other plants and animals were used for fiber, tools, clothing, and medicines. Within the CSNM, these resources were abundant along major streams, in the upland meadows, and especially in the flatter, more open areas in the east along Skookum Creek, Jenny Creek, and in Agate Flat.

Native peoples employed a number of techniques to enhance those resources useful to them. Fire was probably the most significant tool. Fire assisted in promoting and maintaining staple crops, such as acorns and tarweed, and maintained open meadows and prairies, which were crucial locations for subsistence resources including game, roots, bulbs, berry patches, and grass seeds. Fire also promoted habitat important to large game. Burning took place at specific intervals during the spring or fall. This burning contributed to the development and maintenance of prairies and savannahs, oak and oak/pine woodlands, and upland meadows.

This native way of life was severely disrupted with the advent of Euro-Americans, beginning with Peter Skene Ogden's exploration in 1827. Ogden came from the east, following the Klamath River, then headed north over the Siskiyou mountains following an Indian trail into the Bear Creek valley. Ogden's trip, for the British Hudson's Bay Company, was the first of many to follow the north-south route over the Siskiyous. Known as the Oregon-California (O&C) or the Siskiyou Trail, this route was a major conduit of change to the region. Between about 1830 - 1850 numerous trappers, explorers, and others traveled along this route. They brought new people, practices, diseases, plants and animals through and to the region, as well as spreading fear and animosity among the area's current inhabitants.

Severe conflicts broke out in the 1850s between the Indians and the newcomers, with the discovery of gold and advent of thousands of miners and settlers to the region. During the 1850s and 1860s native peoples were largely removed from the CSNM area. Many died from the warfare, disease, and starvation; others were captured and taken to reservations in the northern part of Oregon. The Klamath and Modoc Indians were confined to the Klamath Reservation east of the Cascades. Some Shasta families, however, managed to remain in the Shasta Valley and along the Klamath River, or escaped from the northern reservations to find their way home.

Euro-American settlement in the Rogue and Shasta valleys from the 1850s on spurred the development of a new way of life in the region. Farmers and ranchers began to transform the land. Newcomers built roads following the Siskiyou Trail and the Klamath River, and the Applegate trail east of Ashland. Irrigation works began to move water across the landscape. Hunters severely depleted local game, and brought local extinction to grizzlies, wolves, antelope, and mountain sheep. Recreational use of the area for hiking, hunting, and fishing also began around the turn of the century.

Cattle and sheep ranching became a significant use in the CSNM during the latter half of the nineteenth century. Ranches were established along the Klamath River corridor and its major tributaries, especially along Jenny Creek and Camp Creek, and along Bear Creek in Bear Valley. Like the native peoples before them, ranchers frequently burned the land to promote browse, and used the uplands seasonally for pasture. Grazing was unregulated, and by the early twentieth century many of the pastures and rangelands had been badly damaged from overgrazing. Indiscriminate burning, unlike the careful regime of the native peoples, had damaged timber resources as well.

The memoirs of George Wright provide a fascinating insight to past livestock management and plant community changes within the CSNM. Two excerpts follow (for more refer to Appendix C).

> During the spring of 1889 and 1890 ... hundreds of cattle had just been loosed on the rangeland to graze the southward slopes of hillsides between Hornbrook and the Pilot Rock area ... (George F. Wright, The truth about Reelfoot p.4).
>
> Years ago there was a sheep camp during the summer months on the west side of Bald [Soda] Mountain ... The Bald Mountain area was a wonderful place for grass but the sheep men would herd their sheep there year after year until the grass was killed out. Weeds of different kinds have taken the place of the grass. About 1923 after the sheep had ruined the range, the cattlemen banded together and bought the sheep camp and the land, probably 160 acres. They also leased more land around there in order to keep the sheep men away. (Memoirs of George Wright, Bald Mountain, February 6, 1954 #614).

Logging became more important in the CSNM after the development of transportation routes, such as the railroad in the 1880s, and with the development of the orchard industry and its demand for wooden packing boxes. Small mills existed in the Ashland area and in the area around Lincoln east of Ashland. Major railroad logging operations existed east of the CSNM, with logs from the pine forests of the flat plateau chuted down to the Klamath River and floated to a mill at Klamathon. These early years of logging focused on the most accessible stands of timber, at lower elevations and on the high plateaus in the east, and on sugar pine. It was not until the middle of the twentieth century that developments in logging and transportation technology made logging of high elevation timber stands more feasible.

The advent of government management in the early decades of the twentieth century brought significant land management policies to the area now recognized as the CSNM. Game laws and regulations helped local game populations. Federal grazing regulations eventually helped slow the degradation of some upland areas, and begin the slow, gradual process of recovery. Fire suppression became a mission, and fire suppression policies began to transform the local vegetation patterns. A fire lookout was established on Soda Mountain in 1933.

Recreation continued to be important in the CSNM throughout the twentieth century. Today, the Pacific Crest National Scenic Trail runs north-south through the area, bringing many hikers through the area and passing by Pilot Rock. People still use the area seasonally to hunt and fish. More recent recreational use includes the use of off-highway vehicles (OHV), which allow individuals access to the area with a minimum of improved roads.

For more cultural history of the CSNM, refer to the cultural sections of the watershed analyses for the Klamath-Iron Gate and Upper Bear Creek areas.

Archaeological Sites

Cultural resources include archaeological sites relating to the period of Native American habitation, historic era remains, and areas of traditional cultural importance such as spiritual sites or root gathering areas. There are numerous archaeological and historical sites in the CSNM area.

Specific traditional use areas for Native Americans are as yet undefined. However, according to the traditional Klamath way of life, the value of various resources were integrated with each other and not seen as distinct. That is, the places where people lived or worked or camped--today's archaeological sites--were intimately connected with the distribution of plants and animals and vistas which gave sustenance and often spiritual meaning to the people who used the area. Hence, for the Klamath, the notion of "cultural resources" incorporates significant native plants, animals and viewsheds, as well as the remains of camps or task areas.

Traditional cultural plants and spiritual places, such as Pilot Rock, are also important to the Shasta tribe, today.

Native American Sites

Systematic archaeological surveys in the eastern half of the Monument (east of Soda Mountain) have located close to one hundred sites relating to native peoples' use of the area. Native peoples came to these areas to hunt and gather. None of these sites have been excavated or formally evaluated. Surface remains, however, suggest that most of these sites were related to seasonal use. These are areas where open meadows, oaks, and game still exist. The Agate Flat area also has an abundance of naturally occurring chert (cryptocrystalline silicate) which was an important stone used for tools. Many of the sites show signs of assaying and quarrying toolstone. Several Native American burial sites are also reported for this area (MDO cultural resource files).

Few systematic archaeological surveys have been done in the western part of the CSNM. Nonetheless, several known sites are associated with the extensive system of upland meadows and springs west of Soda Mountain. Sites would also be expected to occur up the major drainage and along the major ridgelines.

Historic Sites

Perhaps the most significant historic site in the CSNM is the remains of the Siskiyou Trail, which is still extant west of Interstate 5 just north of the California border. Rock alignments, blazed trees, and a scatter of artifacts such as cast-off ox shoes document this historic route. A project to further study, document, and retrieve historic materials along this route occurred in the spring of 2000.

The Applegate Trail, a portion of the California National Historic Trail designated in 1992, traverses the area from Greensprings summit to Grouse Butte following much of what is now Highway 66 (see Plate 1). Interpretive markers erected along the trail route by the Southern Oregon Historical Society provide brief messages about the area.

Important issues associated with the Applegate Trail include its preservation and interpretation. Existing and potential conflicts include surface disturbing activities which might disturb archaeological sites associated with the trail.

Historic remains in the CSNM include a complex of structures at the former Box-O Ranch, dating from the late nineteenth and early twentieth century, including barns, sheds, a ranch house, irrigation ditches and a wagon road. Elsewhere in the Monument there are historic cabins that relate to the early ranching days, such as the Bean Cabin just west of Soda Mountain. Though no longer extant, the cabin's remains were studied to determine the original construction. Other historic remains include ditches, dumps, and structural remains generally related to the ranching history of this area.

Geology

The Cascade-Siskiyou National Monument (CSNM) is primarily within the Cascade Mountain Range. The western edge of the CSNM is a part of the much older Klamath Mountain geologic province. The Cascade Mountain Range is comprised of a wide variety of continental volcanic rocks. This volcanic province is divided into two distinct north-south belts: the older Western Cascades and the younger High Cascades (map 6).

The rocks of the Western Cascade Range began erupting around 40 million years ago, and stopped about 10 million years ago (Orr, Orr and Baldwin,1992). During this time the coast line in Oregon ran northwest through the region of the Willamette Valley. The volcanoes of the Western Cascade Range were created by the subduction of the Farallon plate beneath the North American crustal plate. This movement of enormous crustal plates triggered intense volcanic activity.

The Western Cascades in this area are primarily composed of the Colestine and Little Butte Creek Formations. They are approximately 16,500 feet thick and form a stratigraphically complex sequence of continental volcanic, volcaniclastic and sedimentary rocks (Smith and others 1982). They vary from basalt, to basaltic andesite, to andesite. There are numerous tuffaceous, pyroclastic, and sedimentary interbeds. During this volcanism the region was subjected to many intrusions of mafic to felsic dikes, sills, plugs, and stocks. The Colestine Formation is at the base of the Western Cascades. This formation contains ash flow tuff, some of which contain fossil leaves, cones, and plant fragments. Some of these fossiliferous out crops are near Pilot Rock. When this rock was being deposited the region was lower in elevation than it is today and considerably warmer. The beautifully preserved Oligocene plant fossils of metasequoia, sycamore, ferns and more are found within this fine grained, white tuff (Orr 1981).

One of the most striking features of the Western Cascades in this area is Pilot Rock, located near the southern boundary of the study area. It is a volcanic plug - the feeder vent to a now eroded volcano. It is an outstanding example of the "inside" of a volcano. Pilot Rock has sheer, vertical faces up to four hundred feet above its base on a talus slope. It has classic columnar jointing caused by cooling of the hornblende andesite that makes up Pilot Rock (Purdom n.d.).

Other notable geologic features within the Western Cascades include Soda Mountain, Hobart Bluff, and Parsnip Lakes. Agate Flat is a unique flat table land toward the southeastern portion of the study area. This area has been a popular area for rock hounders to collect agate, jasper and petrified wood.

There was a period of no volcanic activity in the region from about 4 to 5 million years ago. It was during this time that the Western Cascade Range was uplifted, tilted eastward, and further eroded. These rocks form an east to northeast dipping homoclinal sequence with dips ranging from 5 to 30 degrees (Smith, 1982). Erosion, assisted by subtropical climates, stripped the material from the volcanoes and redeposited it (Orr, Orr and Baldwin,1992). The drainage patterns in the area are deeply dissected and well-developed in response to landsliding and surface erosion.

The CSNM area north of Highway 66 and extending to the eastern boundary are made up mostly of the High Cascade Range. This range, which started erupting about 4 million years ago and continues at present, virtually buried the severely eroded Western Cascades. The first eruptions of the High Cascades were shield volcanoes and cinder cones. Later, the High Cascades produced a variety of lavas and tuffs, dominated by basalts, which were erupted from a number of composite cones (Orr, Orr and Baldwin,1992).

Jenny Creek roughly follows the contact of the High Cascades and the Western Cascades. Chinquapin Mountain and Little Chinquapin Mountain are a part of the High Cascades. These younger High Cascade shield volcanoes are responsible for the present day topography of the northern portion of the Monument.

A unique feature of the CSNM is the proximity of the Klamath Mountains to the Cascade Range. The geology of the southwestern area of the CSNM is a part of these much older rocks. The Klamath Mountains are made up of seven different exotic terranes that were once parts of the ocean crust or island archipelago environments. Formed in an ocean setting, these tectonic slices were carried toward the North American land mass via plate tectonics. Upon arrival they were accreted to the existing continent, folded and faulted.

The Klamath Mountains were later intruded by granitic rocks (Orr, Orr and Baldwin,1992). One of these intrusions is the granitoid Ashland Pluton, which is age dated at 167 to 148 million years old (D'Allura 1997). Mt. Ashland Pluton is overlain non-conformably by the late Cretaceous Hornbrook Formation. The Cretaceous Hornbrook Formation (135 to 65 million years) is one of the youngest formations within the Klamath Mountains. It is sedimentary sands, muds, silts and volcanic material. Well preserved bottom dwelling clams, snails and cephalopods can be found as fossils. They represent shallow water continental shelf conditions.

The much older Klamath Mountains are adjacent to the Cascade Range near the Siskiyou Summit area. At one time, the Bear Creek Valley and the Colestine Valley were joined but, over time, the Siskiyou Summit fault was uplifted and created a pass where the valley once was. The Siskiyou Summit fault is one of the most significant faults in Oregon and has moved thousands of feet (M. Elliot, Geology, Southern Oregon Univ., pers communication, 1991). At the Siskiyou Pass area these two geologically distinct mountain ranges meet.

Soils

Soils vary in the Cascade-Siskiyou National Monument (CSNM) with land form and source material. The topography is variable in the CSNM with the area around Agate Flat being nearly level to slopes in excess of seventy percent along the head walls of Scotch Creek, Camp Creek and Dutch Oven Creek. Elevation ranges from 2,400 feet along Emigrant Creek to 6,134 feet at the top of Chinquapin Mountain.

Most of the soils were formed in alluvium or colluvium from hard volcanic rocks and, as a result, are often shallow or have a high rock content that affects their water holding capacity (map 7). The volcanic parent material has also influenced the mineralogy of the soil as a large proportion (approximately 50%) of the soils in the CSNM have montmorillonitic clay mineralogy. Soils with montmorillonitic clays have a high shrink/swell ratio which results in large cracks in the soil when it is dry and swelling upon wetting. These soils are very sticky and slippery when wet and have potential for movement at steeper slopes. Mechanical damage to soils containing montmorillonitic clays are difficult to repair, especially the soils with high rock content. Refer to map 8 for location of soils with montmorillonitic mineralogy in the CSNM.

Soils on wet alluvial margins and meadows are typically Klamath (99) and Sibannic (167). These very deep, poorly drained, fragile soils are frequently flooded for long periods between March and May. As a result, rooting depth is usually limited by a water table from March through June. The location of these and other fragile soils in the CSNM are shown on map 9.

The major soils series on the hill slopes of the Western Cascades are typically McMullin (113), McNull (114), Skookum (173), and Tatouche (190). These are well drained, moderately deep to deep soils with clayey subsoils (with varying amounts of coarse fragments), except for McMullin, which is a shallow and loamy soil. Soil patterns and landscape in this part of the Monument are very complex due to differing degrees of weathering of the mixed basalt/tuff/breccia of the Western Cascade material. Soils with clayey subsoils have low strength when wet, while sediment derived from these soils is very fine and becomes suspended in solution (water) for extended periods of time. As a result, these soil types are also susceptible to cutbank failures and turbid runoff.

Soil series in the Agate flat area are Carney (27) and Randcore/Shoat complex (152). The Carney soil series is moderately deep and consist of montmorillonitic clay. The Randcore/Shoat complex consists of a shallow, extremely stony loam soil in association with a moderately deep, loamy soil. This complex occurs as patterned land on the landscape. Soils in the Agate Flat area on alluvial fans ranging in slopes from 12 to 20 percent are the Farva (58), which is a moderately deep, cobbly loam soil, and Tatouche (190) which is a deep, gravelly clay loam over a clay. All of these soils except for Tatouche have soil moisture limitations as a result of depth, rock content, or heavy clay. Refer to the General Soils map (map 10) for location of these soils on the landscape and see Appendix D for characteristics of the identified soils. Also refer to the *Soil Survey of Jackson County* (USDA 1993) for soil descriptions, interpretations and more detailed mapping.

Most of the soils in this area exhibit erosion rates near natural levels except where recent harvesting has occurred or roads have been built. Generally, these areas will have erosion rates noticeably above natural levels for the first three to five years after a disturbance. Natural surface roads and/or roads not maintained often erode above natural rates as a result of being poorly drained or rutted from use during the wet season. Refer to the transportation section for the amount and condition of roads in the CSNM.

Most of the soils in the CSNM are productive but many have limitations of high rock content and/or a perched water table (in the spring time). Soils along ridge lines tend to be shallow which limits water holding capacity. Tree species and grass compete for water and minerals in disturbed forest stands. When stands are opened during tree harvest more sunlight reaches the ground and, as a result, grass species can invade the site. This often affects the types and numbers of soil microbial populations and their ability to synthesize organic material into nutrients available for plant growth. The microbial population of a grass dominated soil is predominantly of bacteria, while an old-growth forest is predominantly of fungi. A fungal dominated soil is more conducive to tree growth, as ectomycorrhizal fungi aid trees by mediating nutrients and water uptake, protecting against pathogens and maintaining soil structure.

Coarse Woody Debris and Soil Health

Large materials (e.g., coarse woody debris, stems, large branches) are important for healthy soil biology. Woody materials influence soil nutrient availability, soil moisture, and soil organism population levels. Soil organisms play a fundamental role in many site processes because they interact with each other and their environment. Soil organisms promote carbon cycling, nutrient transfer, water availability, vegetation vigor, and maintain soil structure. Most biological nitrogen fixation in ecosystems occurs because of soil organism activity. Mycorrhizal fungi increase the absorbing surface area of roots, which directly increases the total soil volume that can be utilized for nutrients and water. Mycorrhizal fungi and other microbes effect soil structure by helping bind soil particles into water-stable aggregates which create soil volume with stable and adequate pore space. Soil pore space is essential for adequate water and air movement required by plants and soil organisms. Many forest dwelling plant and animal species depend on soil organisms and/or fungi for food sources.

Coarse woody debris (CWD) information was collected in four ecoregions of the CSNM. These sampling sites were located in Northern Spotted Owl core areas which represent undisturbed or lightly disturbed old-growth/mature timber stands. This information provides current status of coarse woody debris in these mature stands and was used in determining future coarse woody debris target levels in the Monument Coarse Woody Debris Standards and Guidelines (Appendix JJ).

Climate

The climate in the Cascade-Siskiyou National Monument is influenced largely by the Pacific Ocean, which produces hot, dry summers and mild, wet winters. During the winter months, the moist, westerly flow of air from the Pacific Ocean results in frequent storms of varied intensities. The isohyetal map produced by Oregon Climate Services (Map 11) shows average annual precipitation in the Monument ranging from a low of approximately 24 inches where Jenny Creek crosses the Oregon/California border to a high of approximately 46 inches at Hyatt Lake. Average annual precipitation is also low at the southwest corner of the Monument (less than 26 inches) and where the western edge of the Monument boundary intersects Emigrant Creek (approximately 27 inches). Winter precipitation in the higher elevations usually occurs as snow, which ordinarily melts during the spring runoff season from March through June. Rain predominates in the lower elevations with the majority occurring in the late fall, winter, and early spring. The area where a mixture of snow and rain occurs is referred to as either the rain-on-snow zone or transient snow zone. The snow level in this zone fluctuates throughout the winter in response to alternating warm and cold fronts. Rain-on-snow events originate in the transient snow zone. The rain-on-snow zone in the Bear Creek and Cottonwood Creek Watersheds and the Scotch Creek Subwatershed ranges from approximately 3,500 feet to 5,000 feet. The rain-on-snow zone for Jenny Creek Watershed and Camp Creek and Fall Creek Subwatersheds is estimated to occur from 3,000 to 4,000 feet (Squyres 2000). Table 2-2 shows the acres and percent of each precipitation zone by subwatershed (see Hydrology) and the zones are displayed on Map 12.

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Bear Creek Watershed	1710030801	2,947 (21%)	9,267 (68%)	1,482 (11%)
Upper Emigrant Creek Subwatershed	171003080101	2,947 (21%)	9,267 (68%)	1,482 (11%)
Jenny Creek Watershed	1801020603	0	20,305 (42%)	27,594 (58%)
Upper Jenny Creek Subwatershed	180102060301	0	204 (7%)	2,866 (93%)
Johnson Creek Subwatershed	180102060303	0	403 (91%)	42 (9%)
Middle Jenny Creek Subwatershed	180102060304	0	5,580 (39%)	8,775 (61%)
Keene Creek Subwatershed	180102060305	0	3,532 (21%)	13,059 (79%)
Lower Jenny Creek Subwatershed	180102060306	0	10,586 (79%)	2,852 (21%)
Klamath River-Iron Gate Watershed	1801020604	382 (3%)	8,057 (60%)	5,078 (37%)
Fall Creek Subwatershed	180102060401	0	575 (100%)	0
Camp Creek Subwatershed	180102060402	123 (1%)	3,665 (43%)	4,804 (56%)
Scotch Creek Subwatershed	180102060403	259 (6%)	3,817 (88%)	274 (6%)
Cottonwood Creek Watershed	1801020606	2,363 (24%)	7,390 (73%)	312 (3%)
Upper Cottonwood Creek Subwatershed	180102060601	1,780 (26%)	4,834 (72%)	105 (2%)
Lower Cottonwood Creek Subwatershed	180102060602	583 (18%)	2,556 (76%)	207 (6%)

1 Rainfall *Zone* is less than 3,500 feet for Bear Creek Watershed, Cottonwood Creek Watershed, and Scotch Creek Subwatershed. Rainfall *Zone* is less than 3,000 feet for Jenny Creek Watershed and Camp Creek and Fall Creek Subwatersheds.

2 Rain-on-Snow *Zone* is 3,500 to 5,000 feet for Bear Creek Watershed, Cottonwood Creek Watershed, and Scotch Creek Subwatershed. Rain-on-Snow *Zone* is 3,000 to 4,000 feet for Jenny Creek Watershed and Camp Creek and Fall Creek Subwatersheds.

3 Snow *Zone* is greater than 5,000 feet for Bear Creek Watershed, Cottonwood Creek Watershed, and Scotch Creek Subwatershed. Snow *Zone* is greater than 4,000 feet for Jenny Creek Watershed and Camp Creek and Fall Creek Subwatersheds.

There are three National Oceanic and Atmospheric Administration (NOAA) weather stations adjacent to the CSNM: Green Springs Power Plant (elevation 2,435 ft.) along Emigrant Creek on the western CSNM boundary, Howard Prairie Dam (elevation 4,567 ft.) in upper Jenny Creek on the northern boundary, and Copco Dam (elevation 2,700 ft.) on the Klamath River approximately 2.5 miles from the southeast CSNM boundary. Precipitation distribution by monthly average for these three stations is shown in Table 2-3.

The majority of precipitation falls during November through March (66-69 percent of the yearly total). Annual precipitation can fluctuate widely from year-to-year. The 30-year average (normal) annual precipitation at the Green Springs Power Plant station is 22.44 inches (Western Regional Climate Center 2000), at the Howard Prairie Dam station it is 32.79 inches (Western Regional Climate Center 2000), and at the Copco Dam station it is 19.8 inches (WorldClimate 2000). It is noted that average annual precipitation values from the Green Springs Power Plant and Howard Prairie Dam NOAA Stations are approximately four inches lower than values shown on the isohyetal map (Map 11). The isohyetal lines are generated by the PRISM model that uses point data from NOAA weather stations and a digital elevation model (Oregon Climate Services 2000).

Table 2-3. Precipitation at NOAA Stations - Monthly Means for 1961-1990

NOAA Station	Precipitation (inches)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Green Springs[1]	2.97	2.42	2.41	1.85	1.45	0.87	0.36	0.54	0.95	1.56	3.36	3.70
Howard Prairie[1]	4.78	3.84	3.50	2.40	1.78	1.22	0.51	0.69	1.09	2.20	5.04	5.72
Copco[2]	2.8	2.1	2.1	1.3	1.2	0.8	0.3	0.6	0.7	1.5	3.1	3.3

1/ Source: Western Regional Climate Center 2000

2/ Source: WorldClimate 2000

During the summer months, the area is dominated by the Pacific High pressure system, which results in hot, dry summers. Summer rainstorms occur occasionally and are usually of short duration and limited area coverage. Summer thunderstorms occur in the CSNM with the frequency increasing from the western boundary to the eastern boundary.

The nearest NOAA weather stations with air temperature data are Ashland, Howard Prairie Dam, and Yreka, California. Average monthly maximum, mean, and minimum air temperatures for these three stations are displayed in Tables 2-4, 2-5, and 2-6.

Table 2-4. Average Monthly Max, Min, and Mean Air Temperatures at Ashland NOAA Station (1948-2000)

	Air Temperature (°F)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Max	46.4	52.2	56.2	62.5	69.9	78.0	86.7	85.4	78.9	66.5	52.7	45.8	65.1
Min	29.7	31.8	33.4	36.3	41.6	47.4	51.5	50.9	45.5	38.6	33.9	30.1	39.2
Mean	38.0	42.0	44.8	49.4	55.8	62.7	69.1	68.1	62.2	52.6	43.3	37.9	52.2

Source: Western Regional Climate Center 2000

Table 2-5. Average Monthly Max, Min, and Mean Air Temperatures at Howard Prairie NOAA Station (1960-2000)

	Air Temperature (°F)												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Year**
Max	37.3	42.2	46.1	52.2	61.1	69.9	78.8	78.7	72.5	60.9	43.5	36.4	56.6
Min	20.0	22.0	24.5	28.2	33.8	40.0	44.2	43.6	38.1	32.5	26.8	21.4	31.3
Mean	28.6	32.1	35.3	40.2	47.4	54.9	61.5	61.1	55.3	46.7	35.2	28.9	44.0

Source: Western Regional Climate Center 2000

Table 2-6. Average Monthly Max, Min, and Mean Air Temperatures at Yreka, CA NOAA Station (1948-2000)

	Air Temperature (°F)												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Year**
Max	44.1	50.8	56.0	63.2	72.4	80.8	90.5	89.4	82.1	69.4	53.3	44.2	66.3
Min	24.3	27.3	30.2	34.4	40.4	47.0	52.3	51.2	45.0	36.4	29.9	25.3	37.0
Mean	34.2	39.0	43.1	48.8	56.4	63.9	71.4	70.3	63.6	52.9	41.6	34.8	51.7

Source: Western Regional Climate Center 2000

Real-time weather information and road conditions for I-5 just north of the Monument boundary are available from the Oregon Department of Transportation web site:

- http://www.TripCheck.com/RoadCond/izone7.htm.

The web site features two live cameras: one located at the Mt. Ashland exit and the other near Siskiyou Summit. It also displays a weather station that provides up-to-date weather information for Siskiyou Summit.

Current climatic patterns need to be viewed with a long-term perspective. Based on tree-ring growth rates and recorded meteorological data, the past 200 to 300 years have been marked by cycles of hot, dry spells and temperate-to-cool weather that have lasted varying periods of time (LaLande 1995).

Hydrology

The CSNM is located in the Klamath and Rogue River basins and four watersheds: Jenny Creek, Klamath River-Iron Gate, Cottonwood Creek, and Bear Creek. Table 2-7 and Map 13 display the hydrologic units that fall partially or completely within the CSNM.

Table 2-7. Hydrologic Units within the CSNM

Hydrologic Units	Hydrologic Unit Code[1] (HUC)	Acres within CSNM		Stream Miles within CSNM[2]	
		BLM	Total	BLM	Total
Rogue River Basin[3]					
Middle Rogue Sub-basin	17100308	6,181	13,694	40.4	104.4
Bear Creek Watershed	1710030801	6,181	13,694	40.4	104.4
Upper Emigrant Creek Subwatershed	171003080101	6,181	13,694	40.4	104.4
Klamath River Basin	180102				
Upper Klamath Sub-basin	18010206	46,766	71,479	324.4	477.5
Jenny Creek Watershed	1801020603	29,067	47,899	161.4	277.9
Upper Jenny Creek Subwatershed	180102060301	2,425	3,071	11.4	13.6
Johnson Creek Subwatershed	180102060303	440	445	2.7	2.7
Middle Jenny Creek Subwatershed	180102060304	6,283	14,355	27.6	77.9
Keene Creek Subwatershed	180102060305	9,305	16,591	51.4	100.0
Lower Jenny Creek Subwatershed	180102060306	10,615	13,438	68.3	83.7
Klamath River-Iron Gate Watershed	1801020604	12,502	13,516	121.8	126.2
Fall Creek Subwatershed	180102060401	292	575	0.9	1.1
Camp Creek Subwatershed	180102060402	7,991	8,592	75.8	79.3
Scotch Creek Subwatershed	180102060403	4,220	4,349	45.1	45.8

Table 2-7. Hydrologic Units within the CSNM

Hydrologic Units	Hydrologic Unit Code[1] (HUC)	Acres within CSNM		Stream Miles within CSNM[2]	
		BLM	Total	BLM	Total
Cottonwood Creek Watershed	1801020606	5,197	10,063	41.2	73.4
Upper Cottonwood Creek Subwatershed	180102060601	2,377	6,719	16.0	43.7
Lower Cottonwood Creek Subwatershed	180102060602	2,821	3,345	25.2	29.7

[1] Hydrologic Unit Code is a unique identifier for each hydrologic unit. The first eight digits are designated by the U.S. Geological Society.
[2] Stream miles are from the BLM GIS Hydrography Theme prior to completion of the spatial densification.
[3] Rogue River Basin does not have its own HUC as it is within the Southern Oregon Coastal HUC 171003.

Natural lakes in the Monument area include Hobart Lake in the Upper Emigrant Creek Subwatershed and Parsnip Lakes in the Keene Creek Subwatershed. Portions of Parsnip Lakes are on BLM-administered land while Hobart Lake is not in the CSNM. Large reservoirs within the CSNM Proclamation boundary include the southern portion of Hyatt Lake Reservoir and Keene Creek Reservoir, both in the Keene Creek Subwatershed. There are three other major reservoirs just outside the Monument boundary: Howard Prairie Lake, in the Upper Jenny Creek Subwatershed, Emigrant Lake in the Lower Emigrant Creek Subwatershed, and Iron Gate Reservoir on the Klamath River in the Iron Gate Subwatershed (California). Hyatt, Keene Creek, Howard Prairie, and Emigrant reservoirs are managed and operated by the Bureau of Reclamation and the Talent Irrigation District. Hyatt, Howard Prairie, and Emigrant reservoirs are operated primarily for irrigation in the Bear Creek Watershed, with additional benefits of hydroelectric production and recreational opportunities. Keene Creek Reservoir provides temporary storage for releases from Howard Prairie Lake (via canal) and Hyatt Lake (via Keene Creek). Water is diverted from the Keene Creek Reservoir via canal and penstock to the Green Springs Power Plant located on Emigrant Creek approximately two miles above Emigrant Lake. Iron Gate Reservoir is owned and operated by PacifiCorp as a re-regulating reservoir to offset peak flows that are discharged from two hydroelectric projects upstream of Iron Gate. It also produces electricity, but has no flood control benefits. Many small reservoirs used for livestock watering, irrigation, and forest management activities are located throughout the Monument.

There are numerous springs in the CSNM. Some springs are shown on U.S. Geological Survey (USGS) 7.5 minute topographic maps. The largest spring in the Monument is probably Shoat Spring in the Lower Jenny Creek Subwatershed. This spring forms Spring Creek, a tributary to Jenny Creek, from which 10 cfs of water is diverted and transported to Fall Creek to operate a PacifiCorp hydroelectric plant. The municipal water rights for 15 cfs from Fall Creek are held by the City of Yreka which diverts the water into a pipeline before it reaches Iron Gate Reservoir. Wetlands inventoried by the U.S. Fish and Wildlife Service (USFWS) are displayed on the USFWS wetland maps available on the USFWS Internet site. Mapped wetland locations in the CSNM portions of Klamath River-Iron Gate Watershed and Bear Creek Watershed may be found in the corresponding watershed analysis documents (USDI 2000a and 2000b).

Stream miles in the Monument are shown in Table 2-7. Three types of stream categories are defined in the Medford District Resource Management Plan (USDI 1995a) for riparian reserve protection: fish-bearing, perennial nonfish-bearing, and intermittent. Only a portion of the streams in the CSNM have been inventoried to determine their stream category. Perennial and intermittent stream classification was determined from aerial photos for the Klamath-Iron Gate and Upper Bear Creek Watershed Analyses (USDI 2000a and USDI 2000b). The majority of stream miles within the Monument are intermittent.

There are no continuous streamflow-monitoring stations on non-flow regulated (natural flowing) streams within the CSNM. Unregulated streamflows in the Monument fluctuate with seasonal variation of precipitation. Moderate to high flows generally occur from mid-November through May. Streamflows during the months of March, April, May, and part of June are augmented by melting snowpack in the high elevations. Low flows normally coincide with the period of low precipitation from July through October. The BLM installed a streamflow gaging station on Jenny Creek (regulated by Hyatt and Howard Prairie Reservoirs) downstream of the former Box-O Ranch in the fall of 1997 and it became fully operational in the fall of 1999. At this time, no streamflow data is available from this station.

Peak streamflows in the CSNM are the result of a combination of natural and human-caused factors. Natural factors contributing to peak flows include high intensity storms, snow melt, rain-on-snow events, and severe, extensive wildfires. Human influences having the potential to increase peak flow magnitudes above natural conditions include road construction, timber harvest, land clearing, fire suppression, and reservoirs. High road densities that may contribute to increased peak flow magnitudes are a concern in portions of the Monument within Jenny Creek and Bear Creek Watersheds and the Fall Creek Subwatershed within the Klamath River-Iron Gate Watershed. Timber harvest and land clearing in the Jenny Creek and Bear Creek Watersheds have decreased canopy closure and increased transient snow zone openings to an extent that they are likely to contribute to increased peak flow magnitudes in some drainages. The fire suppression policy of the past century has resulted in a build-up of unnatural fuel loadings, high vegetation density, and a change to fire-prone vegetative conditions. These conditions contribute to the Monument being highly susceptible to a catastrophic wildfire. The high intensity fire produced by a catastrophic wildfire would severely damage soils over large areas and destroy the vegetative cover, including riparian vegetation. Vegetative and soil conditions resulting from a catastrophic wildfire would likely cause a substantial increase in peak flow magnitudes and decrease the time to peak. Direct interception of precipitation by the reservoir surfaces in the Jenny Creek Watershed result in instant delivery of precipitation into the stream system which affects the timing and magnitude of peak flows.

Augmentation and diversion of flows in the Jenny Creek Watershed for purposes of irrigation and hydroelectric production in the Bear Creek Watershed greatly complicate the instream flow regime for Jenny and Keene Creeks within the Monument. Howard Prairie Lake receives water that is diverted from South Fork Little Butte Creek and its tributaries (in the Little Butte Creek Watershed to the north of Jenny Creek Watershed). Water diversions from Hyatt and Howard Prairie reservoirs, from Soda and Beaver Creeks by Talent Irrigation District (TID), and from Spring Creek by PacifiCorp export approximately 30,000 acre feet of water annually from the Jenny Creek Watershed (USDI-BLM 1995b). This quantity represents 28 percent of the estimated total runoff that would otherwise be available to support the basin's aquatic organism populations (USDI-BLM 1995b). Stream systems that have significant increases in summer flows due to augmentation include Fall, upper Keene, Tyler, and Emigrant Creeks. Reservoirs in the Jenny Creek Watershed are not managed for flood control and consequently, the reservoirs may reach full pool early in the water year. When this occurs, peak flows may approximate pre-dam conditions as surplus reservoir water enters the stream system.

The lowest streamflows in the Monument occur during the summer due to both natural and human-caused factors. Natural factors affecting summer flows include low summer rainfall and sustained high evapotranspiration. Summer streamflows in Jenny Creek Watershed are highly influenced by human-caused factors such as water withdrawals, reservoir storage, and interbasin transfers. Low summer flows in the other areas of the CSNM are also affected by water withdrawals, but to a lesser extent. Potential indirect human-caused factors affecting low summer flows include riparian vegetation removal resulting from timber harvest, improper livestock grazing, or residential / agricultural clearing. Loss of riparian vegetation can lead to channel widening, channel agradation, or lowering of the water table (Platts 1991). Channels that become wider and shallower have an increased stream surface area that can be heated up and lost to evaporation and more efficiently drain the adjacent floodplains. Lower water tables signify that less water is moving into the stream channel and thus there would be a subsequent reduction in low flows.

The only existing instream water rights within the Monument were filed by the Oregon Department of Fish and Wildlife (ODFW) for Jenny Creek from Johnson Creek to Keene Creek (Table 2-8). The instream water rights have a priority date of October 26, 1990 and were created to benefit anadromous and resident fish rearing. BLM, in cooperation with Oregon Water Trust, applied to the Oregon Water Resources Department in 2000 for a water right transfer from irrigation water rights for the Box-O Ranch to instream use for the enhancement of aquatic and fish life and water quality.

Table 2-8. Instream Water Rights in CSNM

Stream Name	Instream Water Rights (cfs)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Jenny Creek[1]	8.0	12.0	16.0	16.0	16.0	10.0	6.8	4.6	4.0	5.0	5.0	8.0

Source: OWRD 2000 1/ From Johnson Creek to Keene Creek

The Oregon Water Resources Department (OWRD) is currently conducting an Oregon general stream adjudication in the Klamath River Basin. An adjudication is the Oregon statutory process for quantification and determination of all rights to water, the use of which was initiated before February 24, 1909, and federal reserved water rights, including the rights of Indian tribes and their members. The Klamath Adjudication is the first Oregon general stream adjudication in which complex federal claims have been filed. The BLM filed claims in 1997 for federal reserved water rights under Public Water Reserve 107 for 33 springs in the geographic area of the CSNM, prior to its designation. However, since the period for filing claims ended before the designation, water rights for purposes of the CSNM are not included in the ongoing adjudication. The OWRD completed the claim review in August 1999 and conducted an open inspection of claims from October 1999 through March 2000. The contest filing period was held from April to May 2000. All the BLM Public Water Reserve 107 claims for federal reserved water rights within the CSNM geographic area were contested. The next step in the adjudication process will be for OWRD to refer groups of contests to a hearings officer panel.

The June 9, 2000 proclamation that established the Cascade-Siskiyou National Monument "reserved, as of the date of this proclamation and subject to valid existing rights, a quantity of water sufficient to fulfill the purposes for which this monument is established." This statement in the CSNM proclamation signifies that BLM has a federal reserved water right with a priority date of June 9, 2000 for an amount of water that is necessary to support the plant and animal species identified in the proclamation (i.e., a variety of plant communities including wet meadows and riparian vegetation, rare and endemic plants, fresh water snails, three endemic fish species, butterflies, important populations of small mammals, reptile and amphibian species, ungulates, and numerous bird species including the threatened Northern Spotted Owl). The federal reserved water rights would include all water sources necessary to meet monument purposes, such as springs and instream flows. The amount of water reserved would be based on requirements of the species involved. Quantification of the federal reserved water rights for the CSNM will need to be determined. The BLM reserves the right to assert its federal reserved water rights established by the CSNM proclamation.

Water Quality

The Clean Water Act requires states to identify designated uses of water bodies as a component of the water quality standards. The designated uses are important because they determine the water quality criteria that will be applied to that water body. The Oregon Department of Environmental Quality (ODEQ) has designated the following uses for the Bear Creek Watershed: domestic water supply (municipal and private), industrial water supply, irrigation, livestock watering, anadromous fish passage, salmonid fish rearing, salmonid fish spawning, resident fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, aesthetics quality, and hydropower (ODEQ 1992). The upper portion of the Klamath River Basin crosses from Oregon into California. The 1957 Klamath River Basin Compact between Oregon and California recognizes the following designated uses for the Jenny Creek, Klamath River-Iron Gate, and Cottonwood Creek Watersheds: domestic water supply; livestock watering; irrigation; protection and enhancement of fish, wildlife and recreational resources; industrial; hydroelectric power production; navigation; and flood prevention (OWRD 1997). Water quality standards are typically designed to protect the most sensitive designated uses within a water body. The most sensitive designated uses for the Monument are the protection and enhancement of fish resources, salmonid fish rearing and spawning, aquatic life, and domestic water supply. Temperature, dissolved oxygen, bacteria/pathogens, turbidity, and sedimentation are the key water quality indicators most critical to these sensitive beneficial uses.

Section 303(d) of the Clean Water Act requires each state to identify streams, rivers, and lakes that do not meet water quality standards even after the implementation of technology-based controls. These waters are referred to as "water quality limited" and states are required to submit 303(d) lists to the Environmental Protection Agency every four years. Water quality limited waters require the application of total maximum daily loads (TMDLs) which are a strategy for improving water quality to the point where recognized designated uses of the waters are fully supported. A TMDL addresses pollution problems by identifying those problems, linking them to watershed characteristics and management practices, establishing objectives for water quality improvement, and identifying and implementing new or altered management measures designed to achieve those objectives (ODEQ 1997). Water Quality Management Plans (WQMPs) to address nonpoint sources and TMDLs will be prepared for each watershed in the Monument with listed streams starting in 1999 and scheduled for completion in 2007.

The Oregon DEQ's 1998 list of water quality limited streams includes streams within the CSNM as shown on map 14 and listed in Table 2-9. No streams in the Klamath River-Iron Gate Watershed or Cottonwood Creek Watershed portions of the Monument are on the 303(d) lists. There are 14 parameters considered by ODEQ in the 303(d) listing process. Only a small percentage of these 14 parameters have been assessed in the CSNM to determine compliance with the State's criteria. No water quality monitoring has occurred in the Monument portion of Cottonwood Watershed and only a limited

Table 2-9. Water Quality Limited Streams on the 303(d) List

Watershed	Stream Name	Description	Parameter
Jenny Creek	Beaver Creek	Mouth to Talent Irrigation District Ditch	Temperature - summer
	Corral Creek	Mouth to Talent Irrigation District Ditch	Temperature - summer
	Jenny Creek	Mouth to Grizzly Creek	Temperature - summer
	Johnson Creek	Mouth to headwaters	Temperature - summer
	Keene Creek	Mouth to Little Hyatt Reservoir	Temperature - summer
	South Fork Keene Creek	Mouth to headwaters	Temperature - summer
	Lincoln Creek	Mouth to headwaters	Temperature - summer
	Mill Creek	Mouth to headwaters	Temperature - summer
Bear Creek	Baldy Creek	Mouth to headwaters	Temperature - summer
	Carter Creek	Mouth to headwaters	Temperature - summer
	Emigrant Creek	Emigrant Reservoir to Green Mountain Creek	Temperature - summer
	Hobart Creek	Mouth to headwaters	Temperature - summer
	Tyler Creek	Mouth to headwaters	Temperature - summer

Source ODEQ 1998

amount of monitoring has been done in the CSNM within Klamath River-Iron Gate Watershed.

The DEQ's 1988 Oregon Statewide Assessment of Nonpoint Sources of Water Pollution (NPS Assessment) identifies two stream segments and one reservoir in the CSNM that are impacted by nonpoint source pollution. Table 2-10 identifies affected water-body segments and Table 2-11 lists the probable causes and associated land uses. These water-bodies were not included on Oregon's 1998 303(d) list based on the lack of supporting data, but they are considered Water-bodies of Potential Concern by DEQ (ODEQ 1998:5).

Table 2-10. Water bodies included in DEQ's NPS Assessment

Watershed	Stream Name	DEQ Segment ID	Segment Location	Parameter of Concern
Jenny Creek	Hyatt Lake	337	Reservoir	Nutrients Excessive plant growth
	Jenny Creek	11	Oregon/California border to Howard Prairie Reservoir	Temperature Sedimentation
Bear Creek	Emigrant Creek	286	Emigrant Reservoir to headwaters	Temperature Streambank erosion Low streamflow Sedimentation

Source: ODEQ 1988

Table 2-11. Probable Causes and Land Use Associated with Nonpoint Source Pollution

DEQ Segment ID[1]	Probable Cause of Nonpoint Source Pollution	Land Use Associated with Nonpoint Source Pollution
337	None identified	None identified
11	Surface erosion and elimination of thermal cover	Timber harvesting and road construction
286	Surface erosion and water withdrawal	Irrigated cropland/pastureland

Source: ODEQ 1988

[1] See Table 2-10 for segment location.

Water Temperature

The Oregon State water quality criteria for temperature is established to protect resident fish and aquatic life, and salmonid fish spawning and rearing. The temperature standard for summer temperatures in the Rogue and Klamath Basins was revised in January 1996. The standard now states that the seven day moving average of the daily maximum shall not exceed 64°F. Streams in the CSNM that are known to exceed the temperature standard are listed in Table 2-9 as water quality limited for temperature.

Both natural and human-caused factors contribute to elevated stream temperatures in the Monument. Natural factors that can affect stream temperature in the CSNM include: below normal precipitation and subsequent low summer streamflows, hot summer air temperatures, stream orientation, low gradient valley bottoms, and wildfires and floods that result in the loss of riparian vegetation. Human-caused disturbances that are likely to increase summer stream temperatures include water withdrawals, channel alterations that increase the width-to-depth ratio, and riparian vegetation removal through logging, road building, improper livestock grazing, or residential clearing.

Available stream temperature monitoring data for the Monument may be found in Appendix U.

Dissolved Oxygen

Dissolved oxygen concentration refers to the amount of oxygen dissolved in water. Dissolved oxygen is critical to the biological community in the stream and to the breakdown of organic material (MacDonald and others 1991). Dissolved oxygen concentrations are primarily related to water temperature; when water temperatures increase, oxygen concentrations decrease. (MacDonald and others 1991).

Oregon's dissolved oxygen standard was revised in January 1996. The new standard describes the minimum amount of dissolved oxygen required for different water bodies (i.e., waters that support salmonid spawning until fry emergence from the gravels, waters providing cold water aquatic resources, waters providing cool-water aquatic resources, etc.) (ODEQ, 1998).

Dissolved oxygen data is not available for the Monument, although it is likely to be a concern in streams with high temperatures.

Water Bacteria/Pathogens

Waterborne pathogens include bacteria, viruses, protozoa, and other microbes that can cause skin and respiratory ailments, gastroenteritis, and other illnesses. Most drinking and recreational waters are routinely tested for certain bacteria that have been correlated with human health risk. If the average concentration of these bacteria falls below the designated standard, it is assumed that the water is safe for that use and that there are no other pathogenic bacteria that represent a significant hazard to human health (MacDonald and others 1991). The four groups of bacteria most commonly monitored are total coliforms, fecal coliforms, fecal streptococci, and enterococci. Fecal coliform bacteria are mostly those coliform bacteria that are present in the gut and feces of warm-blooded animals. They can be directly linked to sanitary water quality and human health risks.

Oregon's water quality criterion for bacteria states that for a 30-day log mean of 126 *Escherichia coli* (a species of fecal coliform) organisms per 100 ml, based on a minimum of five samples, no single sample shall exceed 406 *E. coli* organisms per 100 ml (ODEQ, 1998). The purpose of the bacterial water quality standard is to protect the most sensitive designated uses, which are domestic water and water contact recreation.

Bacterial contamination has little effect on aquatic organisms, but is very significant to human use (MacDonald and others 1991). Bacterial contamination of water bodies in the Monument could result from inadequate waste disposal by recreational users, and the presence of livestock or wild animals in springs/wetlands, stream channels, or riparian zones.

No bacteria/pathogen data is available for water bodies within the Monument.

Water Turbidity and Sedimentation

Sedimentation is the natural process of sediment entering a stream channel. However, excessive fine sediments (sand-size and smaller) can cause problems such as turbidity (the presence of suspended solids) or embeddedness (buried gravels and cobbles). Sedimentation is generally associated with storm runoff and is highest during fall and winter.

Oregon's standard for sedimentation states that "the formation of appreciable bottom or sludge deposits or the formation of any organic or inorganic deposits deleterious to fish or other aquatic life or injurious to public health, reaction, or industry shall not be allowed" (ODEQ 1998). Oregon's standard for turbidity states that "no more than ten percent cumulative increase in natural stream turbidity shall be allowed, as measured relative to a control point immediately upstream of the turbidity causing activities" (ODEQ 1998).

No streams in the CSNM are on the 303(d) list for sedimentation, however, Jenny Creek and Emigrant Creek are identified by Oregon DEQ as having sedimentation as a parameter of concern (Table 2-10).

Natural processes that contribute to sedimentation in the Monument include surface erosion, mass wasting, wildfire, and flood events. Natural landslides and slumps are common features in the Upper Emigrant Subwatershed due to unstable soils (see Geology and Soils sections). There have not been any recent major wildfires in the Monument and the most recent flood event occurred on January 1, 1997.

Accelerated rates of upland erosion in the CSNM are primarily caused by road building and logging. Older roads with poor locations, inadequate drainage control and maintenance, and no surfacing are more likely to erode and cause the sedimentation of stream habitats. The Schoheim Road (41-2E-10.1) in the Klamath River-Iron Gate Watershed was inventoried during 1996 and 1997 by Salix Earthcare, Inc. to determine the hydrologic impacts of the road (Salix Applied Earthcare, 1998). The inventory noted that the Schoheim Road caused accelerated erosion and sedimentation and altered hydrology resulting in detrimental effects on downstream water quality and quantity. The erosion problems noted in the Salix Applied Earthcare report (1998) were attributed to inadequate drainage and maintenance and exacerbated by vehicle and OHV use. Road maintenance was conducted on the Schoheim Road in the fall of 1998 to address some of the concerns highlighted in the Salix Applied Earthcare report (1998). The road work consisted of drainage improvements on approximately 12 miles of the Schoheim road, from the western end below Pilot Rock to the intersection with the Lone Pine Ridge Road. The remainder of the Schoheim road received drainage improvements consisting of water bars and dips in the fall of 2000. Road access was blocked in section 10 east of Camp Creek and a gate installed just west of Jenny Creek.

Logging practices such as clearcut logging, logging in unstable areas, and using tractors on steep slopes contribute to increases over natural sedimentation rates. The effects of logging practices on stream sedimentation are primarily a concern in the Jenny Creek, Bear Creek, and the east fork of Camp Creek Watersheds of the CSNM, where logging has been most prevalent. Logging in unstable areas has likely accelerated several hillslope failures in the Bear Creek Watershed portion of the CSNM. The Friends of the Greensprings' (FOG) *Tyler Creek Monitoring Report* (2000) notes a large, active landslide that occurred on private forest land adjacent to Hobart Creek (in the Tyler Creek drainage of Upper Emigrant Creek Subwatershed) in 1998. The FOG report attributes the landslide to harvesting conducted in 1990 and estimates that the landslide moved 150,000 cubic yards of material into Hobart Creek.

Stream bank erosion in the Monument is accelerated by human-caused disturbances such as stream channelization and stream-adjacent land clearing, concentrated livestock grazing, road building, and tractor skid roads. Past stream channelization and stream-adjacent land clearing are major factors contributing to stream bank erosion in portions of Jenny Creek. Poorly managed livestock grazing in the late 1800s and early 1900s throughout the CSNM was likely a significant cause of stream bank damage and subsequent sedimentation. Stream bank damage resulting from concentrated livestock grazing continues to be a concern for some stream reaches in the Bear Creek, Jenny Creek, and Klamath River-Iron Gate Watersheds (USDI 2000b, USDI 1995b, and USDI 2000a). There are many stream-adjacent roads throughout the Monument that confine stream channels and restrict the natural tendency of streams to move laterally. This can lead to downcutting of the stream bed or erosion of the stream banks. Stream-adjacent roads are also a direct source of sediment to adjacent stream reaches. Skid roads that are across, in, or parallel to stream channels are a source of sediment, damage stream banks, concentrate runoff, and divert flows.

The amount of large wood in many stream channels within the Monument is inadequate for dissipating the energy of high velocity streamflows. The result is stream banks that are unprotected and susceptible to erosion. Large wood is discussed in the Stream Channel and Riparian Habitat sections.

Irrigation ditch failures and streamflow diversions also result in increased human-caused stream sedimentation. The Talent Irrigation District's delivery canal in the Jenny Creek Watershed has had several failures that resulted in large amounts of sediment going directly into Jenny Creek (USDI 1995b, p 36). An unnamed tributary to Schoolhouse Creek in the Tyler Creek drainage of Upper Emigrant Creek Subwatershed has been used as an alternate diversion channel for water transported from Howard Prairie Reservoir to Emigrant Lake for hydroelectric power and irrigation. The water is normally routed through the Bureau of Reclamation's Green Springs Power Plant, however, the flow is re-routed down Schoolhouse Creek when the generator is undergoing repair. Approximately 60 cfs was released into Schoolhouse Creek in 1993 to bypass the power plant (Friends of the Greensprings 2000). This amount of water exceeded the stream's carrying capacity and resulted in a debris torrent that moved 200,000 cubic yards of material downstream (Friends of the Greensprings 2000). The portion of the unnamed Schoolhouse tributary on BLM-administered land has been scoured to bedrock and there are actively eroding stream banks (USDI 2000f).

Off-highway vehicle use that results in stream sedimentation has been a concern in localized areas throughout the Monument.

Turbidity data for water monitoring sites in the CSNM are shown in Appendix U.

Table 2-12. Hydrology/Water Quality Monitoring in the CSNM

Subwatershed	Water Temp (1-2 season assessment)	Water Temp (3+ season assessment)	Aquatic Macro-invertebrates	Stream/ Riparian Survey[1]	Channel Cross Sections	Streamflow /Turbidity[2]
Upper Jenny Creek	3 sites	1 site	3 sites	0	2 sites	3 sites
Johnson Creek	1 site	1 site	0	0	1 site	1 site
Middle Jenny Creek	3 sites	3 sites	3 sites	15% initial assessment	3 sites	3 sites
Keene Creek	8 sites	1 site	2 sites	100% initial assessment	3 sites	3 sites
Lower Jenny Creek	0	15 sites	3 sites	0	11 sites	2 sites
Camp Creek	2 sites	1 site	1 site	0	0	0
Scotch Creek	0	0	0	0	0	0
Fall Creek	0	0	0	0	0	0
Upper Cottonwood Creek	0	0	0	0	0	0
Lower Cottonwood Creek	0	0	0	0	0	0
Upper Emigrant Creek	13 sites	0	0	93% initial assessment	0	0
TOTALS	30 sites	22 sites	12 sites		20 sites	12 sites

[1] Proper Functioning Condition (PFC), large wood, flow regime, channel morphology for streams on BLM-administered lands

[2] Staff Gages Gaging Station and turbidity samples

Aquatic Species and Habitats

Portions of Jenny Creek, Bear Creek, Klamath River-Iron Gate and Cottonwood Creek watersheds are included in the CSNM planning area (Table 2-7). Aquatic species and physical habitat for fish are described by watershed, and information on aquatic mollusks is included at the end of this section. Refer to Table 2-7 for data concerning stream miles and acres included for each watershed, Appendix Y for data on aquatic macroinvertebrates, Map 15 for CSNM stream systems and riparian reserves areas, and Map 16 for known fish presence .

Jenny Creek Watershed

In the Jenny Creek watershed, portions of the Upper Jenny Creek, Middle Jenny Creek, Lower Jenny Creek and Keene Creek Subwatersheds fall within the CSNM boundary (see Hydrology section). Major streams within these watersheds include Jenny Creek, Keene Creek, Corral Creek and Beaver Creek.

Aquatic Fauna

The Jenny Creek Watershed is host to a number of aquatic species listed as "peripheral or naturally rare," "vulnerable," or a "species of concern" by both state and federal agencies. Aquatic organisms and their habitats within the CSNM have been the subject of on-going studies as a result of interest in riparian habitat and the streams' unusual fish populations (e.g. Frest 2000, Rossa 1999). There are also a number of introduced fish in this watershed, primarily in headwater reservoirs.

Native Fish

Jenny Creek supports three native fishes: redband trout (*Onchorhynchus mykiss ssp.*), Jenny Creek sucker (*Catostomus rimiculus*), and speckled dace (*Rhinichthys osculus*). These fish species are isolated above an impassable waterfall located south of the California border. Both the Jenny Creek suckers and redband trout are presumed to date back only to the end of the ice age when extensive flooding may have allowed native fish populations in some headwater streams to transfer to others. This "headwater capturing" may be responsible for the presence of Klamath small-scale suckers (*C. rimiculus*) in both Jenny Creek and the Rogue River. The Jenny Creek sucker and redband trout are believed to be genetically distinct because of this geographic isolation. The Klamath speckled dace (*R. osculus*) is widely distributed throughout much of the Klamath River Basin.

The Jenny Creek redband trout (*O. mykiss ssp.*), a subspecies of rainbow trout, is classified as "vulnerable" by both the Oregon Department of Fish and Wildlife (ODFW) sensitive species list and the BLM special status species list. The U.S. Fish and Wildlife Service (USFWS) classifies the Jenny Creek redband trout as a "species of concern." Each population of redband trout is believed to be genetically distinct from rainbow trout (*O. mykiss*) because of geographical isolation. The Jenny Creek redband trout is at risk of dilution by hybridization with rainbow trout introduced to Jenny Creek by state agencies, private sources, and from Howard Prairie Reservoir overflow. Dilution of the redband trout gene pool by hybridization with hatchery fish from upstream reservoirs may eventually mean the loss of this subspecies. However, genetic studies (Currens 1990) indicate that some or all of the redband stock remains intact in parts of the watershed. "Redband genes" are important for Jenny Creek trout because redband trout seem to handle low water levels and high water temperatures beyond the normal range of other salmonids such as rainbow trout.

The Jenny Creek redband trout is distributed throughout the Jenny Creek Watershed in the mainstem and major tributaries (Map 16). Keene Creek, a tributary to Jenny Creek, is an especially important nursery stream for Jenny Creek redband trout (Rossa, unpublished data).

The Jenny Creek sucker is classified as "peripheral or naturally rare" by the BLM Special Status Species list and the ODFW's Sensitive Species list. The federal list, compiled by USFWS, classifies the Jenny Creek sucker as a "species of concern". The Jenny Creek sucker is the same species as the Klamath smallscale sucker found in the Rogue and Klamath Rivers. However, due to its genetic isolation, it receives special designation. The Jenny Creek sucker may also be a dwarf form of the Klamath smallscale sucker. The suckers in Jenny Creek never reach the large sizes of their river-dwelling relatives. However, growth rates appear to be similar (Hohler 1981) so it is unclear whether the Jenny Creek suckers are actually smaller than the Klamath-Rogue fish at a given age, or simply mature earlier and die sooner. The answer to this question is important to ensure the long-term viability of Jenny Creek suckers.

In the CSNM, Jenny Creek suckers are found primarily in mainstem Jenny Creek and Corral Creek. Only a few have been observed in Keene Creek (Rossa 1999). However, the suckers use the entire watershed (including Johnson Creek) throughout the year. They migrate upstream to spawn in smaller tributaries and headwater areas in the spring (Hohler 1981), and disperse throughout the mainstem in the summer. Different areas or, "reaches" of the creek appear to be important for different life stages. Rossa (1999) found that newly-hatched fry, adults, and juveniles were each found in completely different reaches, sometimes miles apart. These distribution patterns may be related to water temperature, spawning locations, irrigation diversions, and food availability. Water releases over Howard Prairie dam may also be affecting sucker habitat (see section on "Stream Channels" below.)

Speckled dace (*R. osculus*) are the most common native fish in Jenny Creek (Rossa, unpublished data). They can be found throughout mainstem Jenny Creek and in its larger, slower tributaries. They are most numerous in low-gradient meadow reaches. Although speckled dace currently do not have any special status, preliminary results from a genetic study (Pfrender and Lynch 1998) indicate the Jenny Creek dace could be genetically distinct. Speckled dace are wide spread throughout the west, but have not been reported in other CSNM watersheds.

Non-native Fish

Rainbow trout (*O. mykiss*), are regularly stocked in Hyatt and Howard Prairie Lakes by ODFW. Howard Prairie Reservoir is not in the planning area, but fish occasionally escape from the lake downstream into the planning area, especially in good water years when water flows over the spillway at the dam. Rainbow trout were also introduced into Jenny Creek by ODFW and private sources in the 1960s and 1980s. The affects of hybridization between introduced rainbow trout and native redband trout were previously discussed.

Golden shiner (*Notemigonous crysoleucas*), an exotic fish, was introduced into Howard Prairie and Little Hyatt Reservoirs as bait fish and occasionally escapes downstream with overflow water. Its distribution, survival, and impact on the Jenny Creek ecosystem is not known however, it has been reported 2 miles downstream of the Howard Prairie Dam (Rossa 1999).

Brown bullhead (*Ictalurus nebulosus*) are also found in the headwater reservoirs of Jenny Creek and has negatively impacted the Hyatt Lake trout fishery. These fish occasionally escape downstream into the Jenny Creek Watershed. Brown bullhead distribution, survival, and impact on the Jenny Creek ecosystem is not known.

Black Crappie (*Pomoxis nigromaculatus*) and largemouth bass (*Micropterus salmoides*) have become established in Hyatt Lake in recent years, and will most likely escape downstream into Little Hyatt Reservoir and Keene Creek Reservoir. The Bureau of Reclamation allows water to bypass Keene Creek Reservoir in high water years, so these fish may reach lower Keene Creek and Jenny Creek. Green sunfish (*Lepomis cyanellus*), and pumpkinseed (*Lepomis gibbosus*) are found in Howard Prairie Reservoir and the Keene Creek Reservoir.

Amphibians and Reptiles

Jenny Creek is host to several amphibians that are dependent on the aquatic environment for their survival. The more common ones are Pacific tree frog (*Psuedacris regilla)*, foothill yellow-legged frog (*Rana boylii*), bullfrog *(Rana catesbeiana)*, Pacific giant salamander (*Dicamptodon tenebrosus*), and rough-skinned newt (*Taricha granulosa*). All are native with the excepiion of the bullfrog. Still water areas and ponds in the mid and lower elevations in the Jenny Creek Watershed are home to a viable population of northwestern pond turtles *(Clemmys marmorata)*. This animal is in trouble throughout most of its range in Oregon, Washington and California due to habitat destruction and predation by introduced species, primarily bullfrogs and largemouth bass.

Aquatic Insects

The Jenny Creek aquatic insect community reflects a mixture of montane and basin stream fauna: species found in northwest mountain streams and in drier basins to the south and east (Appendix Y, Tables AY-5 through 8). Since Jenny Creek is located at the crossroads of several mountain ranges and is adjacent to the Great Basin, widespread, common species from these areas would be expected. However, Jenny Creek's aquatic insect community also lacks many species that would be expected to occur, especially those adapted to year-round cold-water (Aquatic Biology Associates 1991, 1992, 1995).

The aquatic insect community in Keene Creek appears to be typical for streams of its size and location (Aquatic Biology Associates 1993). However, sampling in 1993 (a normal water year) did not find many genera and species ordinarily expected, and found others that were unexpected (Appendix Y, Table AY-2). Missing species included those needing year-round cold water and some of the microhabitat specialists. Unexpected macroinvertebrates included *Pseudostenophylax edwardsi*, a caddisfly typical of very small streams and usually found in more maritime, lower elevation areas, and Hydrobiid snails. The shredder community (insects that feed primarily on fallen leaves) was also surprisingly well-developed.

The insect community reflects the habitat in Keene Creek. The stream does not get large flushing events because half of the water is diverted to the Rogue Valley through the Talent Irrigation District diversion system (see Hydrology section). Water only flows over Keene Creek dam when Hyatt, Little Hyatt, Keene Creek, and Emigrant Lake Reservoirs are full. Hence, leaves and detritus that feed the shredder community are not flushed out as regularly as in a normal stream. Cold-water taxa are missing because water temperatures in Keene Creek are warmer than many streams of the same size in the Pacific northwest. Water diversion and past land management practices are probably contributing to warm water temperatures. Finally, it seems that all the streams in the CSNM area have a slightly different insect community. For example, *Psuedostenophylax edwardsi* is usually found in coastal streams, not in southern Oregon. Such an unusual distribution further indicates the ecological significance of the CSNM area.

Corral Creek's insect community reflects a high level of disturbance in the watershed (Aquatic Biology Associates 1993). There are many insects, but few species (Appendix Y, Table AY-5) and those present are the most tolerant and common insects in western

North America. This differs even from Beaver Creek, a stream just over the ridge from Corral Creek. Normally, aquatic insect communities on adjacent streams are very similar, because adult insects migrate over ridges to colonize new areas.

Beaver Creek's aquatic insect community appears to be typical for streams of its size and location (Aquatic Biology Associates 1993), although water diversions are altering habitat for aquatic insects. Sampling in 1993 (a normal water year) did not find many cool-water genera and species ordinarily expected (Appendix Y, Table AY-3). Instead, the presence of two damselflies, *Argia sp.* and *Enallagma/Ischnura sp.*, indicate that Beaver Creek does not experience typical spring flows that would ordinarily flush these species downstream to warm, slow pool areas. Sampling did find an unexpected, rare caddisfly (*Rhyacophila iranda*).

Crustaceans

Crayfish are common in this watershed. The genus *Pacifasticus* has been identified in the watershed but not to species (Aquatic Biology Associates 1995).

Physical Habitat

Stream Channels

Beaver trapping, ranching, flood control, water diversion, and timber harvest have significantly altered the floodplains and stream channels in the Jenny Creek watershed in the last 150 years. Beaver dams maintained high water tables and wide riparian zones by adding structure to the flood plains, dissipating stream energy, and capturing sediment. As beaver were trapped and removed from the area, these beneficial hydrologic functions were diminished. Floodplains were cleared to provide more pastureland as ranchers became established in the area and efforts were made to control the stream. Eventually, much of the stream through ranch lands was straightened out, berms were constructed to prevent the stream from exceeding its banks, and stream-side shrubs and trees were removed to prevent debris jams from forming or channels from migrating. Grazing along the streams increased bank instability in some areas and, reduced riparian vegetation. Regeneration of large riparian vegetation, which typically occurred following vegetation removal by flood flows or beaver activity, was retarded or prevented by grazing pressure. The combined effect of these actions decreased infiltration rates, increased runoff, and simplified the stream channel.

Flows have been altered in Jenny Creek and its tributaries by both small and large-scale water diversions. Small diversions for agricultural purposes along Jenny, Keene, Beaver and Corral Creeks cumulatively reduce stream flows during summer months. More importantly, Talent Irrigation District diverts water from Hyatt Lake, Little Hyatt Lake, Keene Creek Reservoir, Howard Prairie Reservoir, Soda Creek, and Beaver Creek to the Rogue Valley. Pacificorp diverts water from Shoat Springs Creek. Combined, these exports total approximately 300,000 acre feet of water per year–28 percent of the estimated total runoff that would otherwise be available to support Jenny Creek's aquatic organism populations (see Hydrology Section).

Reduced stream flows decrease a stream's sediment transport capacity (Kondolf and Wilcock 1996). As a result, fine sediments can accumulate on the rocks and in the gravels, reducing food supply and cover for aquatic organisms, and facilitating the proliferation of aquatic plants like *Elodea candensis* (Kondolf and others 1987, Kondolf and Wilcock 1996). As fish habitat becomes degraded over the years, fish may be pushed into marginal habitat (Rossa 1999). This is always a danger in a small, isolated watershed like Jenny Creek because fish cannot repopulate the watershed from the Klamath River, downstream.

The lack of bankfull flows may also be altering the aquatic macroinvertebrate community in ways that negatively impact fish. Ongoing research by Parker and Rossa (unpublished), indicates that abnormally high caddisfly densities may be stripping the rocks of algae important for Jenny Creek suckers. Caddisfly densities may be abnormally high because the rocks on the streambed are not regularly tumbled by spring flushing flows.

High summer water temperature is another factor affecting sensitive fish species in Jenny Creek and its tributaries (see Water Quality section). Ideal summer water temperatures for trout and other cool-water fishes are in the 60 degree range. Once they exceed this range, the fish begin to experience stress and increased metabolic rates. More and more of their food must be used just to maintain their bodily functions, so growth is reduced (Bjornn and Reiser 1991). Higher water temperatures also incubate diseases which readily attack the already stressed fish. Summer water temperatures in excess of 80 degrees Fahrenheit have been recorded during July and August in the lower reaches of the watershed (Appendix U).

Riparian Habitat
Riparian areas differ between the upper and lower halves of the watershed. Riparian areas in the northern half are wider and wetter, dominated by Douglas-fir (*Psuedotsuga mensezii*), alder (*Alnus*), and willow (*Salix spp.*). Riparian areas in the southern, drier half are narrow and dominated by willow, ponderosa pine (*Pinus ponderosa*), and Oregon ash (*Fraxinus latifolia*).

In general, riparian condition appears to be slowly improving in the watershed. Changes in grazing strategy, recovery of previously logged riparian areas, riparian fencing, and streamside plantings are all contributing factors. However, some areas continue to be heavily impacted by land use activities.

Extensive riparian logging along tributaries and the northern half of Jenny Creek in the 1960s has limited the amount of large-diameter wood available to mainstem Jenny Creek. The distribution of this large-diameter wood is very clumped (Rossa 1999). Wood is concentrated primarily in the upstream canyon reaches that still retain large-diameter trees. Flood-deposited wood is rare in the lower meadow reaches because upstream sources are in short supply. Meadow-deposited wood is nonexistent, as riparian trees were removed to facilitate plowing of pasture land. In-channel debris jams are present, but not as extensive as expected in the lower canyon reaches. High water in the winter of 1997 and 1998 moved some wood into downstream canyons and meadow reaches, but overall, it will take some time for wood to become well-distributed throughout the system again.

Bear Creek Watershed

In the Bear Creek Watershed, a portion of the Emigrant Creek Subwatershed falls within the CSNM boundary (see Hydrology section). This area is upstream of Emigrant Reservoir. The primary stream in this area is Emigrant Creek.

Aquatic Fauna

Native Fish
Both resident rainbow trout (*O. mykiss*) and cutthroat trout (*O. clarki*) reside in the portion of the Bear Creek watershed included in the CSNM, but prior to 1999 species distribution was not well known. Electrofishing surveys were conducted by ODFW in 1999 to determine the upstream distribution of fish in Emigrant Creek. Cutthroat and rainbow trout presence was confirmed in eight miles of stream within the CSNM boundary in the Emigrant Creek watershed.

The reticulate sculpin *(Cottus perplexus)* is the only native non-salmonid known to reside in the upper Bear Creek watershed. ODFW sampling efforts (1999) found this species in Porcupine Creek, a tributary to Emigrant Creek.

Non-native Fish
ODFW annually releases hatchery-reared rainbow trout into Emigrant Reservoir, and has released steelhead and coho in the past. In the spring, these salmonids accumulate at the inflow of Emigrant Creek, and some fish move into the stream above the lake. A fishery has developed around this activity. It is unknown how far upstream these non-native fish go but it is assumed that they have altered the genetic integrity of at least some native fish in Emigrant Creek.

Other non-native species residing in Emigrant Reservoir include large mouth bass, small mouth bass, golden shiners, bluegill sunfish, pumpkinseed sunfish, yellow perch, black crappie, and brown bullhead. A channel catfish was netted in Emigrant Reservoir by ODFW in 1996. These non-native fish have access to streams in the Emigrant Creek portion of the CSNM as do hatchery trout but their extent in these systems is unknown.

Amphibians and Reptiles

There is little information available about amphibians in the Emigrant Creek Watershed. Pacific tree frog (*Psuedacris regilla*) and Pacific giant salamander (*Dicamptodon tenebrosus*), are present, and rough-skinned newt (*Taricha granulosa*) and foothill yellow-legged frog (*Rana boylii*) are suspected residents because of the close proximity to populations known to exist in the Jenny Creek and the Klamath River-Iron Gate Watersheds. Northwestern pond turtles (*Clemmys marmorata*) are common residents in Emigrant Reservoir, but upper portions of Emigrant Creek and its tributaries are too steep and lacking of pool habitat to attract and support this species.

Aquatic Insects

BLM has not conducted formal surveys of macroinvertebrate populations and distribution in the Monument portion of this watershed.

Crustaceans

Crustacean populations in the Bear Creek Watershed have not been studied therefore, there is no information on species composition and population dynamics in this system. Crayfish are known to occur throughout this drainage. *Pacifastacus liniusculus* are known to occur in Emigrant Reservoir.

Physical Habitat

Stream Channel

In Emigrant Creek, fish habitat appears to be in moderate condition. Flooding events have scoured the channel, leaving high percentages of bedrock–up to 40 percent of some reaches (ODFW 1997). Substrate material is 20 to 30 percent silt, probably higher than normal for this drainage, and probably due to soil erosion from roads and scoured banks. There are very few fallen trees ("large woody material"). Even in the best reaches it does not exceed eight pieces per 100 meters, and most of it is small-diameter material. As a result, there are few pools in Emigrant Creek to provide rearing habitat for juvenile fish, spawning habitat for adults, and nutrient storage to fuel the aquatic food chain. However, the upper portion of Emigrant Creek is well-shaded (75-80 percent), keeping water temperatures cool, and providing important fish cover and aquatic insect food sources.

The other major tributaries in the Upper Emigrant Creek sub-basin have gradients that are steep, usually greater than 10 percent, and channels are entrenched with steep hillslopes. Transported material is quickly moved through these reaches, and what is not deposited in upper Emigrant Creek or along its limited flood plain ends up in Emigrant Reservoir. Substrate in these upper tributaries is mostly bedrock and cobble. There is little woody material in most of these streams, but shading is fairly good.

Human activities such as logging, road building, removal of riparian vegetation, channelization, trapping, improper grazing, water diversion, and agricultural and residential development have fragmented riparian habitat, destabilized stream banks, increased sedimentation, decreased stream shading, and reduced large wood in streams. Landslides (both natural and human-caused) are more common in the Emigrant Basin than in other areas of the CSNM, and have increased sedimentation in these streams. In the lower reaches, riparian agriculture and water withdrawals have contributed to increased stream temperatures that physiologically stress aquatic organisms.

Riparian Habitat
Stream side vegetation varies considerably in the Emigrant Creek Watershed depending on aspect and elevation. California black oak, Oregon white oak, and Oregon ash are common components of overstory riparian vegetation in southwest-facing drainages. Big-leaf maple, black cottonwood, Ponderosa pine, Douglas-fir and incense cedar, while not common, are also present. North-facing slopes are covered with a mixture of coniferous and deciduous vegetation. Douglas-fir and white alder provide good stream shading along Emigrant Creek above the mouth of Tyler Creek. This combination gives way to a white fir-dominated plant community near the highest elevations in the watershed. Common understory plants are poison oak, manzanita, wedgeleaf ceanothus, and willow.

Klamath River-Iron Gate Watershed

The Klamath-Iron Gate Watershed includes three subwatersheds that partially fall within the CSNM: Camp Creek, Scotch Creek and Fall Creek. The Monument includes the upper third of Camp and Scotch Creeks, those portions north of the Oregon/California border. An estimated 575 acres of Fall Creek Subwatershed is within the Monument.

Aquatic Fauna

Native Fish
Within the Monument, there are several trout populations isolated above waterfalls. These fish may be rainbow trout or redband trout. It is difficult to tell the two apart visually; only genetic analysis can ascertain the difference. At this time, we refer to these fish as rainbow trout; however, we anticipate that some populations will be identified as redband trout in the future. Trout have been confirmed in East Fork Camp Creek through section 34 (T.41S., R.3E.) (ODFW 1997). Rainbow trout have also been confirmed in Dutch Oven Creek.

Very little was known of resident fish populations in Scotch and Slide Creeks prior to 1999, when BLM fisheries biologists undertook presence and absence surveys in an effort to fill this data gap. Resident rainbow trout were observed in Scotch Creek from the mouth upstream to a rock barrier a short distance above the Oregon/California border in T.41S., R.3E., Section 8, SW 1/4. Rainbow trout were also found to be plentiful in Slide Creek from its confluence with Scotch Creek upstream to the Oregon/California border.

Non-native Fish
Hatchery produced rainbow have been released into Iron Gate Reservoir. Their different genetic makeup may have affected the genetic integrity of native trout below barriers in lower Scotch and Camp Creeks.

Amphibians and Reptiles
Parker (1999) surveyed creeks in the Klamath River-Iron Gate Watershed for vertebrates. No stream dwelling amphibians were found although all habitat requirements were present for Pacific giant salamanders (*Dicamptodon tenebrosus*) and tailed frogs (*Ascaphus truei*). Rough-skinned newts (*Taricha granulosa*) were found in upper Scotch Creek, and are also known from small excavated ponds near Bean Cabin in the headwaters of Camp Creek (BLM). It is assumed that the Pacific giant salamander(*Dicamptodon tenebrosus*) is in the perennial portions of streams, although the species was not found by Parker (1999).

Aquatic Insects

In October of 1993 (a normal water year), BLM contracted aquatic macroinvertebrates community sampling (primarily insects) in Dutch Oven Creek (see Appendix Y, Table AY-1). The aquatic insect community was very rich in taxa, with many species indicative of a healthy stream. The aquatic insect community was also "atypical and unusual" for the location (Aquatic Biology Associates 1993). Dutch Oven Creek is a medium-elevation, south-facing stream surrounded by plant communities adapted to dry climates; however, its aquatic insects are more typical of moist, coastal, higher-elevation streams in the western Cascades. In other words, this insect community is out of place. It is an "island" in the midst of insect communities more typical of southern Oregon (Aquatic Biology Associates 1993). It is possible that this insect community remains as a relict after the last glaciation.

Due to this island-like situation, there is high probability that some of the aquatic insects are endemic to the streams on the south-facing slope of the Klamath River-Iron Gate area. Only Dutch Oven Creek was sampled in 1993, but Camp Creek and Scotch Creek are similarly isolated from neighboring streams. Further sampling may provide answers in the next few years.

Crustaceans

Crayfish (*Pacifastacus ssp.)* are a common inhabitant of Jenny Creek and the Klamath River system. They are most likely well established in Iron Gate Reservoir, but there is no evidence yet from stream surveys or other recorded observations that crayfish reside in Scotch or Camp Creeks.

Physical Habitat

Stream Channel

The CSNM portion of the Scotch Creek Subwatershed includes Slide Creek, a primary tributary of Scotch Creek. Within the CSNM, Scotch Creek flows through a narrow valley near the confluence with Slide Creek, then it is confined in a narrow V-shaped valley with steep hillslopes to its headwaters.

In Camp Creek and its major tributaries, Dutch Oven and Salt Creeks stream gradients are steep. In Camp Creek, much of the channel is entrenched within a V-shaped valley with steep hillslopes. Rapids predominate–not surprising, since woody debris is scarce, averaging only five pieces per 100 meters of stream channel (ODFW 1997). Pools are shallow, averaging about 0.5 meters deep. There are no pools with a depth of >1.0 meters. Three bedrock falls occur within the first three miles, and create impasses to upstream migration of fish. Habitat in the two forks of Camp Creek is in very different condition (Parker 2000). In East Fork Camp Creek, over 50 percent of the bank area showed active erosion in 1997, some of it because of cattle activity (ODFW 1997). Parker (1999) attributed large amounts of fine sediment deposition to human-caused impacts (road building, timber harvest, grazing). Off-highway vehicle use in the watershed may also be responsible for some upslope erosion and subsequent siltation in the subwatershed.

Riparian Habitat

Riparian vegetation at lower elevations in Camp and Scotch Creeks is confined to narrow corridors on either side of the perennial streams, especially in areas characterized by narrow V-shaped valleys and steep hillslopes. Tree and shrub growth in these corridors is fairly thick and provides good shade. At the highest elevation, headwater drainages are encompassed in fairly continuous coniferous forest dominated by white fir. Douglas-fir, intermixed with ponderosa and sugar pine, is common throughout the lower elevations. Mock orange is a common understory species.

Cottonwood Creek Watershed

The CSNM planning area covers a small portion of the Cottonwood Creek Watershed, including short segments of the East Fork Cottonwood Creek, Hutton Creek, Chocolate Falls Creek, and Bear Gulch.

Aquatic Fauna

In Hutton Creek, steelhead reportedly spawn in the lower two miles (Maria 1999). However, this area is in California, outside of the CSNM. Local ODFW and California Fish and Game (CF&G) fisheries biologists have no record or knowledge of steelhead or resident trout in Hutton Creek north of the Oregon State line (Maria 1999, Haight 1999).

In East Fork Cottonwood Creek, ODFW found adult steelhead and rainbow trout north of the Oregon/California border in April 1999 (Volpe 1999). Fish presence stopped at an impassable concrete box culvert under the railroad track crossing (T.40S.,R.2E.,Sec.31) approximately three miles upstream of the state border. Only adult fish were observed for some distance below this culvert. The East Fork was involved in a chemical spill from a train wreck in 1998 which resulted in a fish kill. This possibly explains why no young fish were seen in the upper portion of the East Fork. Juvenile salmonids, possibly steelhead, were also found in two un-named tributaries to East Fork Cottonwood Creek, also in section 31. Fish use in one of the two tributaries extended at least to the railroad track crossing. Fish use in the second tributary extended only 400' above the confluence with the East Fork where a debris jam appears to block upstream fish passage.

Very little is known of other aquatic resources in the Oregon portion of this watershed. Volpe (1999) recorded one unidentified frog in one tributary to East Fork Cottonwood Creek.

Physical Habitat

There is very little data or information on stream habitat and riparian condition in the Cottonwood Creek Watershed. Cursory surveys indicate that roads, the railroad, agriculture, and other human practices have negatively impacted both instream and riparian habitat. A local citizen's group is beginning to implement small restoration projects on Cottonwood Creek.

Stream Channel and Riparian Habitat

Information available for East Fork Cottonwood Creek indicates that fish habitat conditions are generally poor (Volpe 1999). just north of the Oregon/California state border, stream conditions provide some spawning habitat for rainbow trout and steelhead. However, upstream of two un-named tributaries in Section 31, the stream channel is deeply entrenched channel, most of the substrate is covered with silt, riparian vegetation is sparse, and very few fallen trees create pools. Cover along the stream was limited with very little shade, and spawning habitat is nonexistent.

Fish habitat within the un-named tributaries is poor to moderate (Volpe 1999). The larger of the two streams flows through a pasture in a deeply entrenched channel with large amounts of silt. Lacking fallen trees, the channel has little complexity and few good pools. This stream has some riparian cover that consists mostly of willows. The second tributary has some good habitat initially, but further upstream it flows through a pasture and is deeply entrenched.

Aquatic Mollusks

The CSNM is home to at least thirteen species of pebblesnails (*Fluminicola sp.*), five species of *Juga*, and four species of freshwater bivalves. An additional seven species of pebblesnails are believed to be present, as well as one species of *Lanx* (Table 2-13). Many of these snails have not been taxonomically described, and additional investigation may reveal new species (Frest 2000).

Table 2-13. Aquatic Mollusk in the CSNM

Scientific Name	Common Name
Confirmed Presence	
Fluminicola n. sp.1	Klamath pebblesnail
Fluminicola n. sp.3	Klamath Rim pebblesnail
Fluminicola n. sp.10	nerite pebblesnail
Fluminicola n. sp.11	toothed pebblesnail
Fluminicola n. sp.12	diminutive pebblesnail
Fluminicola n. sp.14	Fall Creek pebblesnail
Fluminicola n. sp.15	contrary pebblesnail
Fluminicola n. sp.16	Keene Creek pebblesnail
Fluminicola n. sp.17	Fredenburg pebblesnail
Fluminicola n. sp.38	Little Butte pebblesnail
Fluminicola n. sp.39	Chinquapin pebblesnail
Fluminicola n. sp.40	Pilot Rock pebblesnail
Fluminicola n. unassigned	unassigned pebblesnail
Juga (Calibasis) acutifilosa	scalloped juga
Juga (Oreobasis) n. sp. unassigned	unassigned smooth jugas
Juga (Juga) n. sp. unassigned	unassigned plicate juga
Juga (Oreobasis) nigrina	black juga
Freshwater Bivalves Present	
Anodonta oregonensis	Oregon floater
Gonidea angulata	western ridgemussel
Pisidium casertanum	fingernail clam
Margaritifera falcata	western pearlshell

Table 2-13. Aquatic Mollusk in the CSNM

Scientific Name	Common Name
Suspected Presence	
Fluminicola n. sp.32	Rogue pebblesnail
Fluminicola n. sp.33	Stewart pebblesnail
Fluminicola n. sp.34	Evergreen pebblesnail
Fluminicola n. sp.35	Camp Creek pebblesnail
Fluminicola n. sp.36	Clarke pebblesnail
Fluminicola n. sp.37	Beaverdam pebblesnail
Pristinicola hemphilli	pristine pebblesnail
Lanx alta	highcap lanx

Pebblesnails are associated primarily with cold springs and headwaters of streams. The CSNM has a large number of springs, especially in the Jenny Creek Watershed, making it a unique area for pebblesnails. Currently, 41 springs in the CSNM are known to contain aquatic mollusks, 22 of which are on BLM land. Shoat Springs, Schoolhouse Meadow Spring Complex, and Spring Creek are particularly important habitats. They are large springs with healthy populations housing at least six species of aquatic mollusks.

Only the Fredenberg pebblesnail (*Fluminicola n. sp. 17*) has status under the Northwest Forest Plan (USDA 1994a) as a survey and manage species. However, all populations of pebblesnails are considered at risk because of their endemism, their sensitivity to habitat disturbance, and their life history trait of breeding only once in their lifetime. Threats to the species include eutrophication caused by excessive nitrogen and phosphorus levels, reduced dissolved oxygen, elevated water temperatures, water diversions, and excessive sedimentation. Management activities that can threaten mollusk habitat include grazing, logging, mining, irrigation and livestock watering (including pump chances), and road construction (USDI 1998b). Four springs containing mollusks required immediate protection from grazing impacts and have been fenced. The effects of grazing on CSNM aquatic mollusk habitat will be studied as part of the livestock impact study described in Draft Study of Livestock Impacts on the Objects of Biological Interest in the Cascade-Siskiyou National Monument (USDI 2001).

Surveys for freshwater bivalves have been confined to the Jenny Creek Watershed, where the fresh water mussel *Margaritifera falcata* and the fingernail clam (*Pisidium casertanum*) are common. The fingernail clam has also been found in many springs within the CSNM, particularly in systems with heavy sediments.

Terrestrial Wildlife

The area that is now the Cascade-Siskiyou National Monument is becoming increasingly well known for it's biological diversity. Estimates of known and suspected numbers of vertebrate species present vary depending on the source. There are 138 species of birds confirmed (Trail 1999a). Nelson (1997) lists seven species of amphibians, 16 species of reptiles and 61 species of mammals as known or suspected to occur in the area. These numbers pale in comparison to the invertebrate diversity present in the area. The CSNM hosts one of the richest butterfly faunas in the western U.S. with 107 documented species (Runquist 2000). This species richness, across taxa, results in unusual assemblages of species. This area is a mixing zone where "eastside" or great basin species such as pygmy nuthatch and kangaroo rats share habitats with "westside species such as rough skinned newts and Northern Spotted Owls. Here is also a "California" influence reflected in the reptile community. This species richness reflects the diversity of habitats found in the area. For a more detailed description of the vegetative diversity of the analysis area refer to the Vegetation section.

Twenty-four "special status" vertebrate species, three "special status" terrestrial invertebrate wildlife species (all mollusks) are known or suspected to occur in the area and will be discussed below. The CSNM provides important habitat for deer and elk. These game animals will be addressed in this section as well.

Special Status Species

For the purposes of this document, Special Status Species (SSS) include those species that are listed as threatened or endangered, are proposed for listing as threatened or endangered, or are candidates for listing as threatened or endangered by the U.S. Fish and Wildlife Service, under the Endangered Species Act (ESA) of 1973, as amended. Also included are those species listed by the BLM as sensitive and assessment species. For this analysis, those species identified in the *Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl (FSEIS) Record of Decision* (USDA 1994b) for protection by Protection Buffers and Survey and Manage strategies will also be addressed as SSS. The Survey and Manage and Protection buffer designations in the NWFP ROD (USDA 1994b) have no legal relevance in this area due to the Monument designation. However, these species were on their respective lists due to concerns over low numbers and/or possible human caused impacts to their habitats. The concerns for these species are still relevant and they will be affected by whatever management approach is followed in the Monument. By definition, these species are in a "red flag" category. Range-wide inventory and monitoring is needed to better assess habitat needs and population status of many of these species; particularly those that are not presently listed under the ESA. Special management may be necessary at the local level to ensure long-term population viability.

Birds

Bald Eagle *(Haliaeetus leucocephalus)*

Bald eagles nest adjacent to Hyatt Lake and Howard Prairie Reservoirs. There is one nest inside the Monument in the Hyatt Lake area. Surveys for new nests and reproductive success at known nests occur annually at Hyatt Lake and Howard Prairie Reservoir. This species is currently listed as threatened under the Endangered Species Act, but is currently being considered for de-listing by the USFWS. Bald eagles can occasionally be seen in other parts of the Monument particularly in the northern areas by the above mentioned water bodies. Bald eagles have also been seen in the lower Jenny Creek area. The fish populations in Jenny Creek are probably too small to support a bald eagle nest down stream from the lakes but there has been an unsubstantiated report of a nest near the California Jenny Creek Falls segment.

Peregrine Falcon *(Falco peregrinus)*

The Peregrine falcon has recently been de-listed by the USFWS. However, protection of known nesting sites is still required. There is one known nest sites in the Monument and a maintenance plan is being developed for this site.

Several reported sightings of Peregrines have been recorded around prominent rocks and cliffs in the Monument. There have been reported sightings of peregrine falcons in the Jenny Creek canyon. The cliffs along the rim of lower Jenny Creek canyon, Hobart Bluff, Pilot Rock and "Cathedral Cliffs" provide potential nesting habitat. Lower Jenny Creek canyon was inventoried for peregrine falcons in 1992 and 1994. No Peregrines were observed. Hobart Bluff, Pilot Rock, and the "Cathedral Cliffs" have all been checked for occupancy over the years using various methods and intensities of observation.

Hobart Bluff has a high traffic road running past the base of the cliff and there is a branch trail off of the PCNST that goes to the top of the cliff; both of these attributes detract from the suitability of the site. Pilot Rock is subject to substantial recreational use both for sight seeing and rock climbing. The disturbance resulting from this recreational use detracts from the suitability of the site for nesting. Cathedral Cliffs and the lower Jenny Creek canyon receives much less human disturbance due to their remote locations and difficult access.

Lewis' Woodpecker (*Asyndesmus lewis*)

Lewis' woodpecker is a Bureau assessment species. This species is found most commonly in the Interior Valley Zone plant communities. This species is closely associated with mature oak woodlands and oak savannah habitat. Lewis' woodpeckers in the Monument are believed to represent a wintering population. There may be some nesting by this species, but there is no data to indicate breeding in the Monument. They were not found by Alexander (1999) during his breeding bird surveys.

Greater Sandhill Crane (*Grus canadensis*)

The greater sandhill crane is a Bureau assessment species. Primary habitat for both nesting and foraging is wet meadows. There have been a number of sightings of this species in the meadows and grasslands near Hyatt Lake, Howard Prairie reservoir, also at Johnson Prairie (just outside the monument) and Fredenberg Springs (inside the Monument), but there has not been confirmed nesting within the Monument. There has not been any systematic inventory for greater sandhill cranes in the Monument.

Western Meadowlark (*Stunella neglecta*)

The western meadowlark is a Bureau assessment species which is occasionally observed in the Monument. Primary habitat in southwest Oregon is large natural meadows and grasslands. Little is known about population trends in the Monument. Population trend range-wide is decreasing. This is believed to be mostly due to habitat loss resulting from suburban development.

Western Bluebird (*Sialia mexicana*)

The western bluebird is a Bureau assessment species found throughout the Monument. Primary habitat is naturally occurring open areas or early-seral conifer forest. Little is known about population trends within the Monument. This species is impacted throughout its range by introduced competitors such as the European starling and English Sparrow. Both of these introduced species are known to be attracted to and thrive in the presence of humans and human developments such as ranches, feed lots, restaurants, picnic and camping areas and other places where food (grains, insects and garbage) is readily available. After the introduced species are established around human use areas, they can spread to the surrounding wildlands. Natural nest sites for bluebirds are cavities in trees and snags occurring in open areas. The introduced competitors can out compete the bluebirds for nesting sites, and to some degree food. A number of nest boxes to encourage western bluebirds nesting have been erected in the Jenny Creek Watershed particularly near the former Box-O Ranch over the last few years. Surveys to establish their effectiveness have not been conducted.

White Pelican (*Pelicanus erythrorhynchos*)

The white pelican is a Bureau assessment species. It has been observed in various sized groups on Hyatt Reservoir (just outside the Monument) for approximately the past six summers. Little is known about this summer population other than that it is non-breeding and assumed to be from the Klamath basin which lies to the east of the Monument. The pelicans remain for a relatively short time, several weeks to a couple of months.

Northern Spotted Owl (*Strix occidentalis caurina*)

The Northern Spotted Owl is listed as a threatened species under the ESA. Much more is known about this species and its habitat than most others present in the Monument. Most of the northern part of the Monument was identified as the Jenny Creek Late-Successional Reserve, designated under the Northwest Forest Plan (USDA1994a), prior to Monument designation. The Monument contains twenty-one known spotted owl pair sites as defined by the Interagency Spotted Owl Protocol. Seventeen of these sites are in what was formerly known as the Jenny Creek LSR.

Since the late 1980s, almost all of the adult spotted owls on the Ashland Resource Area of the Medford district BLM have been captured and individually marked with a plastic leg band of a site-specific color and/or pattern. These birds are also marked with unique numbered USFWS aluminum leg bands. Most of the juvenile owls produced have also been captured and marked with a standard color "juvenile band" and a USFWS band. Many birds were banded prior to 1990 although there was no effort to catch and band every spotted owl at every site. Since 1990, the policy of banding adults and juveniles was in effect until approximately 1995 across the resource area and has largely been applied to the Monument to date. This has allowed BLM to track movements of individual adults and juvenile owls.

Northern Spotted Owls are generally associated with late-successional coniferous forests, which are characterized by large trees, multi-layered canopies, and a high degree of canopy closure. It is largely due to concerns about the long-term viability of the Northern Spotted Owl that the late-successional reserve (LSR) land allocation was created.

The NWFP ROD (USDA 1994b) directed that 100 acres of the best, most contiguous Northern Spotted Owl habitat on BLM lands be identified and managed as a "core area" of habitat. The area around each of the spotted owl pair sites known as of January 1, 1994 in the Matrix land allocation were established as "core area" of habitat. These cores were given the designation "Unmapped Late-Successional Reserve" in the NWFP ROD. These core areas were to retain this designation into perpetuity regardless of the presence or absence of spotted owls in the future. As these areas were being identified in the Matrix, 100 acres was also identified for each known pair site in the Jenny Creek LSR. As a result of the Monument designation, the old land use allocations of Matrix, Late-Successional Reserve, and Unmapped late-successional reserve no longer apply to the Monument lands. However, the potential late-successional habitat and 100 acre cores established under the NWFP ROD are still ecologically valuable, and are useful in planning management in the Monument landscape.

Current and Potential Spotted Owl Habitat within the Monument

Federal Lands

In 1992, the Ashland Resource Area completed a 100 percent inventory and classification of all resource area lands as to their current suitability and potential for future suitability for use by spotted owls. The information sources for this classification were:

- Operations Inventory data from the BLM Micro*storms system;
- aerial photographs;

- biologists' personal knowledge of the stands;
- field checks of questionable stands

The Medford District BLM uses a modified the McKelvie Habitat rating system to identify Northern Spotted Owl habitat. As the Northern Spotted Owl is closely associated with late-successional and old-growth (LSOG) habitat, it is assumed that habitat suitable for Northern Spotted Owl nesting, roosting, and foraging is also suitable for most old-growth associated species. Every acre of the CSNM was placed into one of the six possible habitat categories (Table 2-14). These are now referred to as LSOG habitat types and the descriptions are listed below Table 2-14.

Private lands were not included in the habitat classification because inventory data on those lands was not available. Map 28 shows LSOG habitat types within the Monument.

Habitat type definitions for Table 2-14:

Table 2-14. Current LSOG Habitat Types in the CSNM

	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6
Acres in Monument	3,426	9,392	3,865	26,218	8,654	1,392
Percent of Monument	6.5	17.7	7.3	49.6	16.3	2.6

- **Type 1**: Nesting: (optimal-meets all spotted owl life requirements). Canopy closure greater than 60 percent and canopy structure multi-layered. Overstory trees greater than 21" dbh. Deformed, diseased, and broken top trees present. Large snags and down logs present. This is the best approximate we have for "old-growth" for planning purposes. This category is considered late-successional.

- **Type 2**: Roosting/Foraging: (meets requirements for spotted owl roosting, foraging and dispersal). Canopy closure usually greater than 60 percent, with generally single layer structure. Overstory trees greater than 16" dbh. Snags and down wood less prevalent than #1; may be very little. This is the best approximate we have for "mature"stands for planning purposes. This category is considered late- successional.

- **Type 3**: Potential Habitat Only: (meets no known spotted owl needs currently). Canopy closure less than 40 percent due to disturbance (logging, fire, etc.), but the area has the potential to become (grow into) habitat #1 or #2 as described above if given enough time and appropriate management. No attempt was made to estimate the time until the stands would reach a habitat type 1 or type 2 condition. Some residual stands in this category might require only a few decades. Others stands, such as recovering clearcuts, might take a century or more.

- **Type 4**: No Potential: (meets no known spotted owl needs currently). Canopy closure less than 40 percent. Natural limitations of the site will not allow the area to develop into habitat type #1 or #2 as described above. Examples include: chaparral, natural meadows, rocky scablands, and oak woodlands.

- **Type 5**: Dispersal with potential: (currently provides structure believed to be important for spotted owl dispersal). Canopy closure greater than 40 percent. Disturbance (fire, logging, etc.) has created this condition, but the area has the potential to become (grow into) habitat #1 or #2 as described above if given sufficient time and appropriate management.

- **Type 6**: Dispersal with no potential: (currently provides structure believed to be important for spotted owl dispersal. Canopy closure greater than 40 percent. Natural conditions limit the canopy closure and forest development potential (tree size and stocking) to the point that the stand will most likely never reach habitat conditions consistent with habitat #1 or #2 as described above.

Currently there are 12,818 acres of habitat suitable for spotted owl nesting, roosting, or foraging (Type 1 + Type 2) within the Monument. This represents approximately 24 percent of the Monument federal land base. Another 12,519 acres (24 percent of the Monument) has the potential to become suitable habitat at some point in the future. Only an estimated 48 percent of the Monument lands have the potential to become late-successional conifer habitat and these federal acres are intermixed with adjoining private lands. As a result, the Monument landscape as a whole will never approach the appearance of a contiguous block of late-successional habitat regardless of the management on federal land.

Private Lands

It is assumed for the purpose of this analysis, that private lands intermingled with the Monument will not provide substantial amounts of suitable Northern Spotted Owl habitat over time. Current and past land management practices employed on private lands in the area support this assumption.

Northern Spotted Owl designated Critical Habitat

The USFWS designated Critical Habitat Unit (CHUs) on federal lands throughout the range of the Northern Spotted Owl after the species was listed as threatened. There are 41,985 acres of CHU #OR-38 in the Monument. Approximately fifty percent of these acres are suitable or potentially suitable habitat for the Northern Spotted Owl. The purpose of the CHUs was to provide essential nesting, roosting, foraging, and dispersal habitat for the species to ensure its long term viability. The specific purpose of CHU OR-38 was to provide linkage between the Western Cascades and Klamath Provinces through the I-5 Area of Concern. The Monument lies on the eastern flank of the I-5 Area of Concern. The habitat types for the lands in common between the Monument and CHU OR-38 is described in Table 2-14.

Northern Spotted Owl reproduction

Several attempts were made to develop regional conservation plans for the Northern Spotted Owl and other late-successional associated species prior to the development of the Northwest Forest Plan (USDA 1994a). These plans attempted to provide a conservation strategy that would ensure the viability of the Northern Spotted Owl. Common to all of these plans was a system of reserves along the Cascades. Although different plans had different reserve boundaries, they all showed a reserve in the general area that is now the Monument. The Monument designation superceded the LSR designation in this area. However, the area that is now the CSNM still has a role to play in the conservation of the Northern Spotted Owl. At one point there was a stated conservation goal of seventeen to twenty reproducing pairs of spotted owls in the general area that is now the Monument. As stated previously, there are twenty-one known spotted owl sites in the Monument. However, not all of the sites in the Monument contribute to recruitment into the region's spotted owl population on a regular basis.

Table 2-15 shows the results of spotted owl site monitoring in the Monument from 1990 through 2000. The BLM has never observed more than 17 pairs in the Monument in any one year. In that year, 1993, there were no young observed at any sites in the Monument. Four of the twenty-one sites have no documented production of young in any year. Consequently, the Monument's Northern Spotted Owl population is not providing the regional population support that was intended to come from this area in the conservation efforts prior to the Monument designation.

There are only four ways to increase spotted owl productivity of the monument:

1) Increase the quality of existing suitable habitat.
2) Increase the amount of suitable habitat.
3) Rearrange the same amount of suitable habitat on the landscape so that it becomes more useful to the owls.

Table 2-15. NSO Reproduction:Fledglings with Pair (#), Nesting (N), Pair (P), or Single (S)

Site #	1990	'91	'92	'93	'94	'95	'96	'97	'98	'99	'00	# of confirmed fledglings produced since 1990
0977	2	2	1	P	2	S	P	1	P	S	00	8
2285	S	P	N	P	N	P	P	P	2	P	P	2
2404	S	1	1	P	1	S	N	P	P	00	00	3
3272	00	00	2	N	2	1	1	S	N	1	S	7
2270	1	1	00	S	00	P	N	P	1	2	2	7
0061	2	P	1	N	N	N	S	P	N	00	00	3
2078	2	2	1	P	P	P	N	1	P	P	00	6
1305	P	S	2	P	2	P	P	S	P	00	00	4
2020	00	P	S	S	S	S	NS	00	00	00	00	0
0092	00	S	S	P	3	P	3	00	00	S	S	6
0891	N	P	P	P	1	P	1	P	00	00	P	2
3273	NS	NS	N	N	2	P	N	1	N	P	00	3
0966	00	S	P	P	NS	00	00	00	NS	S	00	0
4043	00	00	P	P	P	P	2	2	1	P	P	5
0962	P	2	2	P	2	S	2	S	1	P	2	11
4063	00	00	00	P	2	P	N	P	1	P	P	3
3274	00	00	P	S	00	00	00	00	S	P	00	0
3278	NS	S	1	P	1	00	00	00	00	S	1	3
4536	S*	NS	NS	NS	NS	NS	NS	NS	NS	1	P	1
0930	S	P	1	P	2	1	P	S	S	00	S	4
4061	NS	NS	NS	P	S	NS	NS	NS	NS	NS	NS	0

N: Nesting pair present, no fledglings observed
S: Single bird present.
1: Nesting pair present, 1 fledgling observed
2: Nesting pair present, 2 fledglings observed
3: Nesting pair present, 3 fledglings observed
P: Pair present
00: Surveys performed, no birds detected
NS: Site was not surveyed this year

* Single male heard during surveys as part of Rosebud timber sale. Units in area dropped from sale with ACEC nomination. No further surveys until CSNM planning effort.

4) Expand the Monument to include more suitable habitat and active spotted owl sites.

Of these possible strategies, probably only number 2 is feasible, because there is not the expertise or time for #s 1 and 3; and #4 (expansion of the Monument) is not an option at this time.

Potential for Spotted Owl Dispersal

Banding records make it clear that the spotted owls in the Monument are not currently isolated from spotted owls in the NWFP Matrix. It is also clear that there is genetic exchange with populations to the north, east and west. There is no documented spotted owl movement in either direction across the I-5 corridor within the Monument or to and from the LSRs to the west of the Monument. However, in one notable case, a bird banded as a fledgling near Ruch, Oregon was recaptured some years later in the Jenny Creek LSR as a breeding adult. This bird moved 35 miles into the Monument area. The route this individual took is unknown. Table 2-16 below indicates the distance between the Monumem and the closest neighboring LSRs.

Table 2-16. Distance and Direction to nearest LSRs from CSNM

Direction	Center to Center Distance (miles)	Edge to Edge Distance (miles)	Majority Ownership of Intervening Lands
N	18	5	Federal Matrix and Private Industrial Timberlands
SE	21	6	Private, Unknown Type Use
W	12	5	Federal Withdrawn Reserved and Private mixed Type Use
E	None	None	N/A

Golden Eagle (*Aquila chrysaetos*)

While the golden eagle is not listed under the ESA and is not a Bureau Sensitive species, it is protected under the Bald and Golden Eagle Protection Act of 1940. There are no known nests in the Monument. There have been numerous sightings in the Jenny Creek and Emigrant Creek drainages, and it is likely that there are undiscovered nests in the timbered patches in the southern portions of the Monument. This species is associated with late-successional habitat in this part of it's range; it builds large nests in dominant overstory trees. The nest trees often have significant defect, such as a blown out top or large branches, and are usually one of the largest diameter trees in mature and old-growth stands. Known nest sites are located several miles outside of the Monument.

Northern Goshawk (*Accipiter gentilis*)

The northern goshawk is a Bureau-sensitive species. In southwest Oregon, this species appears to be a foraging habitat generalist and a nesting habitat specialist. Preferred nesting habitat for northern goshawks in this part of their range is late-successional Mixed Conifer and White Fir Forest plant communities. Nests are built in crotches of forked trees, at the base of large limbs, or at the "barber chair" of a blown out top that has been replaced by an upward curving side branch that has assumed apical dominance. Nest trees are usually among the largest diameter trees in the stand. There are three known nest sites within the Monument. There has not been any systematic inventory for goshawks within the Monument. However, numerous incidental sightings documented over the years make it likely that there are as yet undiscovered nests in the Monument.

Great Gray Owl (*Strix nebulosa*)

The great gray owl is a Bureau-sensitive species. Great gray owls in southwest Oregon nest in mature/late-seral Mixed Conifer and White Fir Forests, and forage primarily in the meadows/grassland or early-seral stand conditions of conifer forests. There is one known great gray owl nest site in the Monument. Since 1992, there have been some opportunistic inventories for great gray owls, but no widespread systematic inventory in the Monument. However, incidental sightings have been reported over the years. It is highly likely that there are undiscovered nests in the Monument. The mix of mature timber stands and grassy open areas in the southern portions of the Monument looks especially suitable for the Great Grey Owl. Population trend in the Monument is unknown, but based on the number of reported sightings and the results of surveys in adjacent matrix lands to the north, the population in the southern Cascades appears to be stable.

White-headed Woodpecker (*Dendrocopos albolarvatus*)

The white-headed woodpecker is a Bureau assessment species. In southwest Oregon, primary habitat is found in the White Fir and Mixed Conifer forests where pines are a component of the conifer stands. This species nests in cavities it creates in relatively large pine snags. Little is known about this species within the Monument. However, field observations indicate that the population is probably quite small. There are only occasional reported sightings of white-headed woodpeckers in the northern portion of the Monument.

Black-backed Woodpecker (*Picoides arcticus*)

The black-backed woodpecker is a Bureau assessment species. Little is known about this species in the Monument. In this area, primary habitat is found in the white fir communities.

Northern Three-toed Woodpecker (*Picoides tridactylus*)

The northern three-toed woodpecker is a Bureau assessment species. Little is known about this species in the Monument. Primary habitat is found in the White Fir Forests.

Pileated Woodpecker (*Dryocopus pileatus*)

The pileated woodpecker is a Bureau assessment species that is found throughout the Monument. Primary habitat is mature/old-growth Mixed Conifer and White Fir coniferous forests. It is also found in lower elevation woodlands in fewer numbers than in the other zones, but only if conifers or hardwoods are large enough to create nest and roost cavities. Nothing is known about actual population trend for this species in the Monument. Populations have likely declined due to harvesting of the mature/old-growth coniferous forest previous to designation of the Jenny
Creek LSR in 1995, and later, the Monument.

Flammulated Owl (*Otus flammeolus*)

The flammulated owl is a Bureau assessment species that is found throughout the Monument. Primary habitat is conifer forest intermixed with oak-woodland and grassland in mixed conifer communities. Population trend in the Monument is unknown. This species has been most often detected during spotted owl inventories. Flammulated owls nests in cavities created by other birds species (pileated woodpecker) in large pine trees and snags.

Pygmy Nuthatch *(Sitta pymaea)*

Primary habitat is mature/old-growth conifer forest with a component of pine in the mixed conifer and white fir communities. An open canopy is preferred. Roost sites, which may shelter over 100 individuals, are very important for winter survival. Little is known about this species in the Monument other than that its occurrence has been documented. There are no known roost sites in the Monument. There has been no specific inventory of this species in the Monument.

Reptiles and Amphibians

Western Pond Turtle (*Clemmys marmorata*)

The western pond turtle is a Bureau-sensitive species. Preferred habitat is ponds or streams with abundant aquatic vegetation, basking structure (rocks and/or logs), and adjacent terrestrial habitat suitable for nesting and overwintering (Holland personal communication 1993). They are generally found below 3,600 feet in elevation. There are several known populations within the Monument.

Preferred nesting habitat is dry, clay soil on a southern aspect. Western pond turtles generally overwinter under the duff layer of a tree or shrub. They have been observed (in other parts of their range) to travel up to 300 meters from water to find overwintering sites. Some individuals are known to spend up to nine months at a time on dry land. Consequently, this species is somewhat dependant on upslope as well as in-stream conditions.

In other parts of the turtle's range grazing in and near the riparian zone impacts nests due to trampling. This may occur in the Monument as well, although it has not been documented. Nests are also lost to predation by racoons (native species) and opossums (introduced species). Ashland Resource Area initiated an informal monitoring program for two Jenny Creek turtle populations in 1994. There is not enough data to show any trends.

Cascade Frog (*Rana cascadae*)

The Cascade frog is a Bureau assessment species. The frog prefers mountain meadow habitat characterized by marsh marigolds and small ponds or potholes with little aquatic vegetation. This species is known from at least one location in the Monument. Extensive, but informal, surveys for aquatic amphibians conducted in 1999 in the southern portion of the Monument resulted in negative results for this species.

Mammals

Fisher (*Martes pennanti*)

The Fisher is a Bureau assessment species. Preferred habitat is dense conifer forests in mixed conifer and white fir communities. There are no recent records of Fisher in the Monument. Populations were quite high in the upper portions of the Jenny Creek Watershed at the turn of the century, but intensive trapping caused a decline in the population. There is no concrete explanation why Fisher have not recovered with the decrease in trapping pressure, but it is speculated that habitat loss due to intensive timber harvest and associated road building has kept the population depressed. Track counts were conducted in portions of the old Jenny Creek LSR in the winters of 1992-93 and 1993-94 with negative results.

There are no specific protection measures prescribed for this species. The steps necessary to protect the species and its habitat are largely unknown, other than the retention/protection of hollow logs and trees, large tree and snag cavities, and large horizontal brooms as potential den sites.

American Marten (*Martes americana*)

The marten is a Bureau assessment species. Preferred habitat is mature/old-growth conifer forests with an abundance of large down woody material and standing snags in mixed conifer and white fir communities. Marten tracks have been found in the Jenny Creek Watershed in the Howard Prairie and Johnson Creek areas. It is highly likely that marten occur in the Monument. However, little is known about the present distribution and abundance of this species in the Monument. Historically, the population is believed to have been quite high, but declined because of intense trapping. As with the fisher, habitat loss due to intensive timber harvest and associated road building probably has kept populations depressed.

There are no specific protection measures prescribed for this species. It is largely unknown what steps are necessary to protect the species and its habitat other than retention/protection of potential den site, in hollow logs and trees, large tree and snag cavities, and on large horizontal brooms.

Pacific Pallid Bat (*Antrozous pallidus*)

The Pacific pallid bat is a Bureau assessment species. Preferred habitat is canyons and other rocky areas near water sources in arid areas. There are records of this species occurring in the Monument. However, little is known of its distribution and abundance.

Townsend's Big-eared Bat (*Plecotus townsendii*)

The Townsend's big-eared bat is a Bureau sensitive species. Preferred habitat is caves, crevices, and abandoned mines. There are no known records of this species being present in the monument. The standard bat inventory technique of mist netting over water sources does not usually result in captures of this species because their superior echolocation ability allows the bats to detect and avoid the nets. The absence of this species in inventory data should not be interpreted as absence of the species in the survey area. The rimrock/cliffs of the lower Jenny Creek canyon, Pilot Rock area, and the "Cathedral Cliffs" likely provide suitable habitat. Townsend's big-eared bats have been found in the Klamath Canyon, which is nearby to the south east of the Monument (and were reported to be present at Pilot Rock according to the nomination document).

Fringed Myotis (*Myotis thysanodes*)

The fringed myotis is a Bureau assessment bat species. It appears to be a habitat generalist since it is found in both forested and non-forested habitats. Caves, crevices, abandoned buildings, or other similar structures are required for nursery colonies. There are records of this species occurring in the Monument, but little is known of its distribution and abundance.

Terrestrial Mollusks

There are three species of terrestrial mollusks (slugs and land snails) with special status that are known or suspected to occur in the Monument (Table 2-17). These species are listed in the *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (USDA 2001) which amends the Northwest Forest Plan Record of Decision (USDA 1994a). There have been limited surveys by researchers in the Monument. Down wood and vegetative cover are important habitat attributes for these species.

Table 2-17. Special Status Terrestrial Mollusks known or suspected in the CSNM

Species	Status	Presence
Helminthoglypta hertleini (land snail)	S&M	Suspected
Monadenia Chaccana (land snail)	S&M	Probable
Trilobopsis tehemana (land snail)	S&M	Suspected

Special Emphasis Species

Butterflies

The CSNM provides habitat for an unusually large number of butterfly species, both common and rare, for a relatively small area. Collections have been made at several localities over the years. Runquist (2000) observed 107 butterfly species at Oregon Gulch RNA, Scotch Creek RNA, Pilot Rock Area, and the Soda Mountain Area in the past few years (Appendix Q). Runquist feels that the potential number of butterfly species in the CSNM total over 120 (Jackson County = 118 documented species, Klamath County = 124 documented species).

The mardon skipper (*Polites mardon*) is a federally listed species of concern (SoC) found in the CSNM. It is considered as globally imperiled and rare by the Nature Conservancy and is on the Oregon Natural Heritage Program List 2 (1995). The Klamath mardon skipper (*Polites mardon klamathensis*) was recently described from the Soda Mountain Area (Matton and others 1998) and is included under the mardon skipper listing. This rare endemic subspecies is known only from the southern Cascades (Lake of the Woods, Dead Indian Plateau, and Soda Mountain) in Klamath and Jackson County, Oregon, and the Shasta Valley in northern California. The type locality (the geographical place where the specimens are found) is along the Soda Mountain Road in the CSNM. The Soda Mountain population occupies a small, moist, grassy forest glade along the Soda Mountain Road (39-3E-32.3) at 4,500 to 4,800 feet elevation. Runquist (1999) observed up to 300 individuals at Mardon Meadow, a name he bestowed on the type locality glade.

The species uses native fescues, including Idaho fescue (*Festuca idahoensis*), as host plants (Matton and others 1998, Potter and others 1999). The Klamath mardon skipper was observed visiting an unidentified clover, probably for nectar, at the type locality. Although precise demographic information (size, survival) is unknown, the Soda Mountain population is thought to be small.

Butterflies are discussed further under the sections dealing with the RNAs (Appendices DD and EE).

Deer and Elk

As a result of public interest, Black-tailed deer (*Odocoileus hemionus*) and Roosevelt elk (*Cervus elaphus*) are considered special emphasis species in the area. These species are not old-growth/late-successional habitat associated; they are dependant on early-successional stages for forage. They have been given special attention in the assessment because of their recreational value for both hunting and viewing. The Medford District RMP (USDI 1995a) designated big game management areas (map 29). Two of these areas, Jenny Creek Elk Management Area and State line Deer Winter Range Area, fall entirely within the Monument. The Emigrant Creek Deer Winter Range area is partially within the Monument. The Jenny Creek Elk Management area is 9,900 acres. The combined acreage of the two deer winter range areas within the Monument is 7,650 acres.

Black-tailed Deer *(Odocoileus hemionus)*

Both a residential population and a migratory population uses the Monument. The resident population appears to make a short distance altitudinal migration, mostly within the Monument. The migratory population includes individuals that summer as far away as Fort Klamath, Oregon on the east side of the Cascades.

The Monument includes Agate Flat which ODFW considers to be the most important deer winter range in southwestern Oregon. Deer trend counts conducted by Oregon Department of Fish and Wildlife (ODFW) indicate a 50 percent reduction in Black-tailed Deer population in southwest Oregon since 1991. Historically, there have been some decreases in the population due to die-offs during extreme winter weather, but the population has recovered. In recent years, surveys have revealed lower than desired buck/doe ratios. This finding indicates heavy hunting pressure in the areas used by the deer in the fall and/or poor escapement of legal bucks. High road density and large expanses of land without adequate hiding cover on the summer/fall range are suspected of contributing to poor buck survival through the hunting season.

Most of the deer using the Monument generally winter in the lower elevation woodlands and summer in the Mixed Conifer and White Fir Forests and openings at higher elevations. Habitat condition on both the winter and summer range is fair.

Summer range forage condition appears to be fair but declining, but there is concern that managing the upper elevation areas of the Monument for predominantly late-successional forest conditions will limit forage availability on public lands. ODFW is concerned about decreases in summer thermal cover due to intensive timber harvest (both recent and historic) on both private and public lands in the area.

Forage condition on deer winter range is deteriorating due to the encroachment of unpalatable exotic grasses and forbs, fire exclusion from the mountain chaparral vegetative community, and livestock use, particularly on private land. Yellow starthistle, medusahead, and cheatgrass are some of the more common introduced species that are displacing native grasses and forbs. Compared to native species, these exotics produce poor deer forage. Fire exclusion has allowed wedgeleaf ceanothus (the browse species favored by wintering deer) to become decadent and of little forage value.

Under natural conditions, fire regenerates wedgeleaf ceaonothus. Due to intensive, largely successful fire suppression efforts, wedgeleaf has declined. Existing plants are old and decadent and forage quality and quantity have decreased dramatically. The objective of several controlled burns in the winter range area in Oregon was to regenerate wedgeleaf ceanothus. These burns were small, occurred over 10 years ago and were only marginally successful.

Deer in this area use the timbered stringers which are intermixed with the brush fields, open areas, and oak woodlands for thermal cover. Winter thermal cover generally has the following attributes:

- conifer stands composed of trees greater than approximately 30 feet in height
- canopy closure 70 percent or greater
- the stands are greater than 0.50 acre

Thermal cover present on the winter range in the Monument is limited due to the natural open condition of vegetation at lower elevations. What limited cover there is aids deer in energy conservation by retarding heat loss and can make the difference in survival in extreme weather. Thermal cover condition on winter range has been degraded primarily by timber harvest.

Roosevelt Elk *(Cervus elaphus)*

Roosevelt elk are present throughout the Monument in varying numbers. There are substantial herds found in the Chinquapin Mountain and Keene Creek Ridge areas and a small herd in the Cottonwood Creek drainage west of Interstate 5. The rest of the elk in the Monument tend to congregate in smaller scattered herds. Radio telemetry indicates that there is very little, if any, interchange of individuals from the herds separated by the freeway. ODFW trend counts for the Rogue Big Game Management Unit indicate an increasing population of elk. The counts are not specific to the Monument, but the population trend in the Monument should not differ much from the management unit as a whole. Habitat condition for elk is judged to be good as reflected in the increasing populations. ODFW is concerned about potential competition between elk and deer for the somewhat limited available forage because of the increasing elk population on shared winter range.

The elk management area in the Jenny Creek Watershed was established to emphasize elk management in the watershed's valley floor. The Jenny Creek Elk Management Area encompasses 15,300 acres of the Jenny Creek Watershed and overlays deer winter range as well. Part of the former Jenny Creek LSR (now referred to as Old-Growth Emphasis Area) overlays the elk management area. A combination of improved habitat conditions, especially forage conditions, and a regulated elk population would minimize the competition between elk and wintering deer.

Vegetation

The vegetation patterns and plant communities in the Cascade-Siskiyou National Monument are the result of the interaction between the living organisms and their environment over time. Topography, aspect, soils, geology, climate, fire, other organisms (pathogens, herbivores, vectors), and geographical position at the nexus of the Cascade, Klamath, and Eastern Cascade Slope Ecoregions interact to develop the complex and rich pattern of CSNM vegetation.

Plant communities in the CSNM area can be broadly classified into grasslands, shrublands, woodlands, mixed conifer, white fir, semi-wetlands and wetlands. Although these communities do not reflect the full biological richness of the CSNM, descriptions in the following sections on rare and threatened plant and wildlife species, habitat, and communities better describe the area's biological richness. Map 17 serves as a framework for describing the ecology and distribution of plant communities across the CSNM landscape.

The mixed conifer plant community occupies the greatest area within the CSNM landscape (26,933 acres). White fir predominates on more fire protected areas at high, above 4,500 feet, elevation (3,135 acres). Grasslands, shrublands and woodlands (22,772 acres) dominate on southerly facing slopes leading downwards from Pilot Rock, Soda Mountain, and Keene Creek Ridge towards the California border and the Klamath River. Table 2-18 shows amount of area occupied by major plant communities in the CSNM.

Table 2-18. Major Plant Communities within the CSNM

Plant Communities	Area (acres)
Grassland	9,788
Shrubland	6,573
Woodland	6,411
Mixed Conifer	26,933
White Fir	3,135
Semi-wet meadows	31
Wet meadows	76

Plant Community Groupings

Plant communities in the Monument have been grouped into two "Emphasis Areas" for the purpose of addressing and prioritizing management of the respective plant communities and ecosystem processes (map 41). The Grasslands, Shrublands, Woodlands, Semi-Wet Meadows and Wet Meadows make up the "Diversity Emphasis Area" while the Mixed Conifer and White fir plant communities make up the "Old-Growth Emphasis Area". A brief description of each Emphasis Area will precede the description of the plant communities within them. These Emphasis Areas will be referred to throughout the document, particularly when describing possible vegetation management alternatives in Chapter 3.

Diversity Emphasis Area

The Diversity Emphasis Area (DEA) is the land in the CSNM that consists of hardwood, shrub, grass, semi-wet meadow and wet meadow plant communities. There are an estimated 19,741 acres of federal land in the Diversity Emphasis Area with the majority located south of Soda Mountain.

Unlike conifer communities, the plant communities in the DEA are characterized by large changes in species abundance over relatively short periods of time. This is because many plant species have short life spans, and are dependent on fire and insects for reproduction. Various herbaceous species thrive for only a few years before conditions change enough to prevent growth. Shrub species may become decadent after a few decades, and need to be renewed through activation of their seedbank by fire. Furthermore, many hardwood species are dependent on fire for creating conditions favoring their persistence on the landscape. This condition is best described in terms of fuel-loading. Presently, fire exclusion has led to high fuel conditions conducive to intense fires with the potential to kill above-ground parts, as well as latent, below-ground buds.

Grass, Shrub, Woodland and Meadow Plant Communities

Hickman (1971) reports a series of rangeland sites descriptions, many of which occur within the CSNM. These vegetation descriptions also form the basis for the Natural Resource Conservation Service (NRCS) (1993) vegetative sites. A description of these vegetation types can be found below. Where named differently, the NRCS (1993) derivative is provided in brackets.

Grasslands

Slope, aspect, elevation, edaphic conditions, mineralogy, fire history, and weed invasion all play a role in creating the range of grasslands and conditions present within the analysis area. It is likely that many grasslands have converted to annual grasses and starthistle consequent to fire exclusion, poor livestock management, and weed invasion. Particularly susceptible are sites with soils dominated by montmorillonitic clays. The moisture induced shrink-swell action of the montmorillonitic clays constitutes an endogenous disturbance favoring weed invasion. Medusahead and yellow starthistle are common on such Carney and Coker clay dominated soils. Lower elevation grasslands contain a high proportion of non-native annual grasses. Controlling noxious weeds and other non-native grasses constitute the major vegetation management objectives for grassland plant communities.

Steep Foothill Grasslands [Droughty Foothill Slopes]

Bluebunch wheatgrass (*Agropyron* [*Pseudorogneria*] *spicata*) dominate the sites with variable amounts of Idaho fescue (*Festuca idahoense*) and Lemmon needlegrass (*Stipa* [*Achnatherum*] *lemmonii*). Sites occur on shallow soils on south-facing slopes that exceed 40 percent. Elevation ranges from 1,800 to 4,000 feet.

Steep Mountain Grassland [Shallow Mountain Slopes]

Idaho fescue (*Festuca idahoense*) dominates the sites with variable amounts of bluebunch wheatgrass (*Agropyron* [*Pseudorogneria*] *spicata*) and Lemmon needlegrass (*Stipa* [*Achnatherum*] *lemmonii*). Sites are located on steep (over 40 percent) south-facing slopes with shallow, rocky soils. Elevation varies from 3,000 to 5,500 feet.

Dry Meadow

This community exists on flatter sites on moderately deep soils with a high shrink swell capacity. Ground vegetation consists of California oatgrass (*Danthonia californica*), pine bluegrass (*Poa secunda* [*P. scabrella*]), and various forbs. These meadow sites may have a scant canopy cover of shrubs and oaks. The shrink-swell capacity action of the soil may facilitate invasion by annual grasses such as cheatgrass and medusahead. Elevation varies from 1,600 to 6,000 feet.

Shrublands

Brush fields are occasionally interspersed in the oak woodlands community, particularly the portion of the Monument north of Keene Ridge. At lower elevations, patches dominated by whiteleaf manzanita (*Arctostaphylos viscida*), wedgeleaf ceanothus (*Ceanothus cuneatus*), and poison oak (*Rhus diversiloba*) are common. At higher elevations, deerbrush (*C. intergerrimus*), mountain whitethorn ceanothus (*C. cordulatus*), skunkbrush sumac (*Rhus trilobata*), and brown dogwood dominate the brush fields. Chokecherry (*Prunus virginiana*), bittercherry (*P. emarginata*), Klamath plum (*P. subcordata*), birchleaf mountain mahogany (*Cercocarpus montanus*), pale serviceberry (*Amelanchier pallida*), and yellow rabbitbrush (*Chrysothamnus viscidiflorus*) also make up a significant portion of the brushfield flora. This complex collection of shrubs is commonly known as Southern Oregon Chaparral.

Shrub Scabland [Loamy Shrub Scabland]

Shrub communities occupy a greater portion of the landscape within the Agate Flat area. Wedgeleaf ceanothus (*Ceanothus cuneatus*) is the dominant shrub within this community. Fire exclusion has resulted in a preponderance of mature and decadent shrub maturity classes across the landscape. These shrublands frequently have a hardwood component in the form of Oregon white oak, birchleaf mountain mahogany, and the various plum species. The soils are shallow, rocky, and consequently well drained.

The herbaceous component of the shrub scablands are frequently dominated by annual grasses, particularly under wedgeleaf ceanothus canopy. Starthistle infestations occur throughout the shrubland areas, doubtlessly established through wind-dispersal of plumed seeds, as well as agents such as off-road vehicles, livestock, deer, elk, and hiking boots.

Mahogany-Oak-Fescue

Communities dominated by members of the rose family (plums and chokecherry (*Prunus* spp.), birchleaf mountain mahogany (*Cercocarpus montanus*), and serviceberry (*Amelanchier alnifolia*) are commonly referred to as rosaceous chaparral.

Woodlands

Oak woodlands in the CSNM are predominately at lower elevations and on south-facing and west-facing slopes. Oregon white oak woodlands frequently represent the major tree dominated associations of the Agate Flat portion of the CSNM (in the Lower Jenny Creek Subwatershed) and on south-facing slopes of Keene Creek Ridge and Rosebud Mountain. Soils and fire have been the most frequent coarse influence. The result is a mosaic of brush fields, scattered trees, grasslands, and pockets of conifers.

The integration of woodlands with grasslands and shrub scablands imply that the ecological issues and management objectives for grasslands and shrub scablands are also pertinent to woodlands. In addition to concern about weeds and shrub age/maturity class distribution, woodlands also show conifer invasion and overly dense understories of a younger cohort of Oregon white oak consequent to fire exclusion.

Juniper Scabland [Loamy Juniper Scabland]

This site is defined by dry conditions, and may intergrade with steep mountain grasslands, various woodlands, and shrub scablands. Soils are shallow with a high percentage of bare ground. Associated forbs and shrubs show a Great Basin heritage.

Oak-Juniper-Fescue [Droughty Slopes]

The woody dominants of this community indicate a mixing of flora from the Great Basin and Siskiyous. Often remarked as a plant community distinct for this region, it is commonly found across the Agate Flats and adjacent southerly-facing ridges.

Oak-Bunchgrass [Droughty Fan]

Oak-bunchgrass sites are common within the lower elevation Agate flats area. Identified as areas of high canopy cover by oaks, these sites frequently identify the only areas with an intact native bunchgrass understory.

Oak-Pine-Fescue [Loamy Hills]

This site type occurs most typically on gently rolling hills at low elevations and on steep south-facing slopes at the higher elevations. Overstory is dominated by Oregon white oak with secondary amounts of ponderosa pine. Understory is mainly Idaho fescue (*Festuca idahoense*) with minor densities of bluebunch wheatgrass (*Agropyron* [*Pseudoroegneria*] *spicata*). Forbs are variable. Soils are well-drained, shallow, and rocky.

Oak-Pine-Oatgrass [Clayey Hills]

Canopy cover of Oregon white oak, usually at high densities, with minor amounts of ponderosa pine. The dominant grass is California oatgrass. Soils are clayey at subsurface horizons. These sites are typically found on gentle slopes or flats at both north and south aspects.

Pine-Oak-Fescue [Loamy Slopes]

Overstory is dominated by ponderosa pine, Oregon white oak, and/or California black oak. Ground cover consists of high densities of Idaho fescue (*Festuca idahoense*). Mid-story may include birchleaf mountain-mahogany, serviceberry, and/or Klamath plum. Soils are moderately deep and are well-drained. Most sites occur on rolling hills, though some are found on steep slopes.

Riparian Vegetation

As defined here, riparian vegetation grows where adequate water from nearby streams and small ponds or a high water table can support a terrestrial broadleaf deciduous plant community along their margins. These species cope with the long, dry summers by growing where there is adequate water to meet their transpirational needs throughout the dry period. These plant communities may have been impacted by past livestock activities.

Typical trees include: Oregon white alder (*Alnus rhombifolia*), black cottonwood (*Populus balsaminifera* var. *trichocarpa*), Oregon ash (*Fraxinus latifolia*), and bigleaf maple (*Acer macrophyllum*).

Commonly encountered shrubs are mock-orange (*Philadelphus lewisii*), willow species (*Salix* spp.), Douglas spiraea (*Spiraea douglasii*), ninebark (*Physocarpus capitatus*), Indian-plum (*Oemleria cerasiformis*), and Douglas hawthorn (*Crataegus douglasii*).

The NRCS (1993) database identifies a loamy flood plain of Abin soils. Associated plants include willow, himalaya blackberry, common snowberry, skunkbush sumac, Pacific serviceberry, Pacific poison oak, Klamath plum, black cottonwood, Oregon ash, Oregon white oak, Kentucky bluegrass, and wild grape.

Special Plant Communities

Included within special communities are plant groupings considered rare within the larger, regional landscape (Western Juniper-Oregon white oak, Rosaceous chapparal), groupings rare within the Monument (Mountain Mahogany stands, old growth Sugar Pine stands), plant communities susceptible to undesired change (biscuit scablands), or, plant communities of great ecological significance within the analysis area (aquatic vegetation, and wet and semi-wet meadows). Refer to map 18 for the location of these special plant communities across the CSNM.

Biscuit Scabland [(Biscuit-Scabland (Intermound), Biscuit Scabland (Mound)]

The wet lands associated with patterned ground and vernal pools support a diverse and biologically important flora. As vernal pools dry seasonally, they undergo a series of transformations with one set of species replacing another. These vernal pools are characterized by certain plant species including: Howell quillwort (*Isoetes howellii*), least mouse-tail (*Myosurus minimus*), mountain navarretia (*Navarretia intertexta*), downingia (*Downingia elegans*), and various species of popcorn-flowers (*Plagiobothrys* spp.). The most significant species is Bellinger meadowfoam (*Limnanthes flocosa* var. *bellingeriana*), a Federal Species of Concern and Oregon Natural Heritage Program Level 1 species is discussed further under Plant Species with Special Status section.

The characteristic biscuit scabland, or mound and swale topography is relatively rare on the landscape. In the analysis area these topographies are generally associated with grasslands with a predilection for annual grass invasion.

Oak-Juniper-Fescue [Droughty Slopes]

Kagan and Caicco (1996) describe a western juniper-Oregon white oak woodland on south slopes and rolling hills found around Siskiyou Pass and Pilot Rock east along the California border often on deep clay, stony soils. A similar type is found in the Oregon Gulch RNA. Western juniper and Oregon white oak co-dominant with ponderosa pine along the margins or as isolated individuals within the stand. Wedgeleaf ceanothus is the dominant shrub, although Klamath plum (*Prunus subcordata*), Brewer oak (*Quercus garryana* var. *breweri*), and serviceberry (*Amelanchier alnifolia*) are important under the oak canopy. Idaho fescue (*Festuca idahoense*), bluestem wheatgrass (*Agropyron* [*Pseudoregneria*] *spicata*), California oatgrass (*Danthonia californica*), pine bluegrass (*Poa sucunda*), and needlegrasses (*Stipa* [*Achnatherum*] spp.) are dominant native grasses. However, the habitat is usually dominated by introduced alien annual grasses, including Medusahead rye (*Taeniatherium caput-medusae*), dogtail (*Cynosurus echinatus*), and various *Bromus* species. Forbs include: wooly sunflower (*Eriophyllum lanatum*), Western hawksbeard (*Crepis occidentalis*), narrowleaf desert parsley (*Lomatium triternatum*), Oregon mariposa lily (*Calochortus tolmei*), Blepharipappus (*Blepharipappus scaber*), and woolyhead clover (*Trifolium eriocephalum*). At lower elevations, yellow starthistle (*Centaurea solstitialis*) can be a significant weed.

Rosaceous Chaparral Types [not described by Hickman 1971 or NRCS 1993]

Brock and Callagan (1999a) have discovered that the eastern Siskiyou rosaceous chaparral for which the Scotch Creek RNA was established consists of three relatively distinct plant communities.

Oregon white oak / Klamath Plum-Wedgeleaf Ceanothus

This community is a minor component of the Scotch Creek RNA, occurring on the lower and middle slopes of the west aspects of Lone Pine Ridge and extending south across the Oregon / California border. It is a typical dry-site chaparral but appears to be fairly localized in its occurrence. It differs significantly from similar communities in the Applegate Valley because poison oak is absent. This community may extend up the Klamath River Canyon to the east.

Oregon white oak is always present, usually in shrub form, at a cover which can vary widely depending on soil depth. Wedgeleaf ceanothus and Klamath Plum are both usually present with covers averaging 23 percent and 57 percent respectively. Klamath plum is clearly the more abundant species on most sites. Birchleaf mountain mahogany is common at the higher elevations with covers of up to 5 percent. Annual grasses (*Bromus japonicus*, *B. tectorum* and *B. mollis*) dominate the grass / forb layer with frequent *Lomatium californicum*, *Claytonia perfoliata* and *Dichelostemma capitata*.

The soils supporting this type are classified as McMullin-Rock Outcrop complex. This community typically has very gravelly surface soils. Elevation ranges from 3,000 to 4,000 feet. The aspect is south to southwest. Slope position is lower to mid.

Oregon white oak / Mountain Mahogany-Klamath Plum Chaparral Complex

The upper slopes of the west face of Lone Pine Ridge are covered with a dense chaparral consisting of a mix of white oak, birchleaf mountain mahogany, with a regular presence (but low cover) of Klamath plum. Some areas are dominated by white oak with reduced levels of mountain mahogany; other areas are dominated by mountain mahogany with white oak cover reduced; much of the area is a more or less equal mix of these two. Where mountain mahogany is the dominant (and white oak cover low), canopy gaps are frequent and the herb layer is significantly more dense as well as more diverse with several dry-site (grassland) species occurring in the canopy gaps. Most of the area is very dense and extremely difficult to walk through.

Throughout the area, the dominant herb-layer species are *Claytonia* (both *perfoliata* and *parviflora*), *Galium aparine*, and *Nemophila parviflora*. These species are the same as are found to be dominant in the White Oak Woodland type and in the chaparral on Slide Ridge. Three other species, however, are found in high frequentcy in this complex; *Hydrophyllum occidentale* (average 2 percent cover), *Osmorhia chilensis* (1 pecent) and *Clarkia rhomboidea* (average 2 percent cover). These elements are significantly different than the Slide Ridge chaparral complex.

This complex consists of roughly the following proportions:

- 40% "Mixed Type" with white oak averaging 60 percent cover and mountain mahogany averaging 50 percent cover with 3 percent chokecherry and 3 percent Klamath plum and with 4 percent tall snowberry. This type closely resembles some of the drier chaparral (Mt. mahogany dominant) found on Slide Ridge.
- 30% "Dry Type" with Mountain mahogany averaging 65 percent and white oak averaging 5 percent. Klamath plum is usually present a 1 to 2 percent cover. Chokecherry and snowberry are usually absent. This type has frequent small open spots with dry-site species such as *Collomia granidflora, Bromus sterilis, Lomatium californicum* and *Eriophyllum lanatum*.
- 10% White Oak Woodland: see separate description for the type; it occurs here fairly randomly often in the form of a large (apparent) clone in the middle of one of the other types.
- 10% Grassy openings; with typical mid-slope annual-grassland species; star thistle was not seen in this part of the RNA.
- 10% Rock outcrops

There does not seem to be any apparent aspect affinities in this complex except that the "Dry" Type (Mt. Mahogany dominant) seems to prefer the more southerly aspects. For the most part, the types are apparently randomly mixed.

The soils supporting this type are mapped as Heppsie-McMullin complex. The elevations ranges between 4,200 and 5,100 feet. The aspect is mainly southwest with some due west and some due south.

Oregon white oak / Mountain Mahogany-Snowberry Chaparral Complex

On the entire east slope of Slide Ridge (west of Scotch Creek) is a complex similarly dominated by Oregon white oak and mountain mahogany but more moist than the Lone Pine Ridge complex. There is considerable variation in species composition across the slope and some patterns are discernable. However, there are no clear delineations, and all of the "types" more or less integrated. The vegetation is fairly uniformly short-statured (10-20 feet in height) and moderately dense. The tree/shrub layer cover is consistently high, averaging 90 percent. White oak is always present with an average cover of 54 percent. Mountain mahogany is usually present with an average cover of 30 percent. Snowberry is usually present with an average cover of 18 percent. Serviceberry, tall Oregon grape, Klamath plum and chokecherry all have high frequency and average 2 - 9 percent cover. Mock orange (*Philadelphus*) and Indian plum (*Oemleria*) occasionally occur. *Claytonia* (*perfoliata* and *parviflora*) and *Galium aparine* dominate the herb layer with *Smilacina racemosa* usually present. Other high frequency species include *Nemophila parviflora, Viola sheltonii* and *Clarkia rhomboidea*. This complex differs from the Lone Pine Ridge chaparral complex in the consistent high cover of snowberry (average 18 percent), the consistent presence of *Smilacina racemosa* and *Viola sheltonii* and the significantly lower cover of *Hydrophyllum, Clarkia rhomboidea* and *Osmorhiza chilensis*. It also lacks the dry grassland species which are fairly frequent in the Lone Pine Ridge chaparral.

While it is difficult to distinguish distinct types in this complex, there are some patterns which can be described. The complex is roughly composed of the following mix of community types:

- 40% White Oak-Mt. Mahogany; White Oak Dominant: This type averages 60-70 percent white oak and 20 percent mountain mahogany with 20 percent snowberry; it is fairly moist and occurs on northeast, east, southeast aspects.
- 20% White Oak-Mt. Mahogany- Mt. Mahogany dominant: This type averages 30-35 percent white oak and 60 percent Mountain mahogany with snowberry much less abundant; it is fairly dry and usually occurs on southeast aspects. This type is closely related to the "mixed" type of the Lone Pine Ridge upper complex.
- 10% White Oak Woodland: see the separate description for this type. It occurs here on east and southeast aspects, typically on lower slope position.
- 5% Riparian: in each of the small draws which dissect the area there is a narrow band dominated by dense *Philadelphus*, with *Holodiscus* and occasional maple.
- 5% Rocky grassy openings: typically on southeast aspects, often with a strong native Idaho fescue component.
- 20% Sites with Douglas Fir-White Oak or Douglas Fir/Serviceberry-Oregon Grape conifer potential are mostly dominated by white oak (40-50% cover), mountain mahogany (20-25% cover) and snowberry (32% cover) like the previous two types, but also have consistent serviceberry (20% cover) at higher elevation. Also distinctive in this more moist type is the regular presence of chokecherry, baldhip rose, silktassle, *Oemleria, Lonicera ciliosa* and occasional thimbleberry. The herb layer also has some distinctive species such as *Trientalis latifolia* and *Moehringia macrophylla* which are both usually present with a 2 percent cover. Douglas fir, black oak and ponderosa pine are present in some of the areas. The potential for some of this area is for an open canopied Douglas-fir or ponderosa pine overstory with white oak or black oak in the understory and continued fairly dense shrub layers. Some areas are trending toward the Douglas-fir/Serviceberry-Oregon Grape (PSME/AMAL-BEPI) type. Other areas seem to be more trending toward keeping Oregon white oak as a co-dominant. It is probable that most of this area has not seen much more than scattered conifers for a long time due to repeated fires, but given enough time without disturbance, the conifer component would develop. This does not mean that the area "should" be pushed toward conifer dominance...it just means that the ecology of the area is more difficult to interpret than was formerly thought. These conifer-potential sites are on north and northeast aspects, often clearly delineated by ridgelines.

The soils in this area are mapped as Bogus very gravelly loam with large inclusions of Heppsie-McMullin complex. Aspect includes north through southeast with northeast dominant. The elevation ranges from 3,000 feet to 4,100 feet.

__Mountain Mahogany__ (not described by Hickman 1971 and NRCS 1993)

The Curlleaf Mountain mahogany series by Sawyer and Keeler-Wolf (1995) is the only vegetation description that approximates the isolated stands of Mountain Mahogany occurring within the analysis area. However, the description includes many species not present within the analysis area.

Rock Outcrops (not described by Hickman 1971 and NRCS 1993)

Rock outcrops are sparsely vegetated with the most frequent species being *Juniperus occidentalis, Prunus subcordata, Bromus tectorum, Pseudoroegneria spicata, Alyssum alyssioides, Penstemon deustus* and *Lomatium californicum*. At higher elevations, *Sedum obtusatum* is common. A large population of *Woodsia oregana* also occurs at the higher elevations. A large sprawling member of the Hydrophyllaceae, *Phacelia ramosissima* var. *eremophila*, interesting eastern Oregon species, was found in protected (shady) areas of rock outcrops. The distinctive Scotch Creek RNA rock outcrop plant community is frequently associated with grassland complexes and outcrops in tree and shrub dominated communities. *Opuntia fragilis* is associated with the Cathedral Cliffs area.

Franklin and Dyrness (1973) describe two xeric meadow communities that could be associated with rock outcrops: forest openings with exposed bedrock dominated by cryptogams; and rock-bound communities dominated by *Sedum oregonense*, Caespitose Polygonaceae, and Xeromorphic ferns.

Semi-Wet Meadows

Sites are located on flats under semi-wet conditions. Moderately deep, clay-loam soils are poorly drained. Site is dominated by California oatgrass (*Danthonia californica*) and meadow sedge (*Carex praticola*). Swamp buttercup (*Ranunculus orthorhynchus*) is usually the dominant forb on various elevations.

Meadows in the White Fir Zone frequently have islands of white fir in them. The white fir in these islands form compact, densely stocked clumps where crowns extend to the tree base on the meadow's outer edge. The interiors of these tree groups are protected from wind exposure and moisture extremes. A moist, shady microclimate is maintained that is beneficial to tree and stand vigor and that is preferred habitat for many wildlife species.

Some openings in the white fir forest are maintained by late melting snow fields. These openings are important as the main habitat for Klamath lambs-tongue (*Erythronium klamathense*), an endemic species known mostly from the Southern Cascade and Klamath River Ridges Ecoregions. Yellow-bells (*Frtilliaria pudica*), also abundant in these openings, is an example of an east of the Cascade species that illustrates to the importance of the CSNM for connectivity. The western most distribution of Yellow-bells is the Rogue River Valley.

The NRCS (1993) data identify poorly drained bottoms (rush, sedge, mannagrass, cattail, willow, timothy), wet loamy terraces (Douglas spirea, common snowberry, Ponderosa pine, Idaho fescue, Western fescue, Pacific serviceberry) , semi wet meadows (California danthonia, sedge, clover, timothy, redtop, Canada bluegrass, Kentucky bluegrass, slender wheatgrass), and wet meadows (tufted hairgrass, meadow barley, sedge) as plant communities mediated by wet edaphic conditions. Many of these plant communities attract livestock during the latter part of the summer after senescence of the upland herbaceous vegetation.

Springs, seeps, semi-wetlands, wetlands and high elevation meadows occupy the smallest area of the landscape relative to other plant communities. Their relative rarity on the landscape define a limited habitat for vascular and non-vascular plants, insects, amphibians, birds and mammals. The specialized nature of these areas also attract unwanted attention from live-stock and off-road vehicles.

As a source of water, springs, seeps and other moist areas attract livestock during the drier, hotter parts of the summer. Heavy grazing, deposition of urine and fecal matter, and trampling are detrimental to many permanent residents of these sites. While native ungulates can have the same effect on water sources, their lower numbers make annual landscape-wide impact unlikely.

Wet areas frequently identify more open habitats within conifer plant communities, particularly within the higher elevation white fir habitat. These open areas invite road construction and illicit OHV use. OHVs could disseminate weed seeds and alter the hydrology of wet areas, though their impact is generally less severe than that of livestock. Road construction has altered the hydrology of wet areas, while also providing access for livestock. Removal of existing roads may constitute an undesired disturbance to plant communities that have stabilized since initial road construction.

Aquatic Vegetation

Aquatic vegetation consists of those species that grow in or near still or flowing water and may be free-floating or attached and/or emergent. Free-floating species include various duckweeds and their relatives (*Lemna, Spirodela,* and *Wolffia*). These tiny plants float on the surface of ponds and in still water of flowing streams. Common attached floating vegetation consists of water-star wort (*Callitriche* sp.), waterweed (*Elodea*), various species of pondweed (*Potamogeton*), water smartweed (*Polygonum amphibium*), and Indian pond-lily (*Nuphar polysepalum*). Emergent species include: cattail (*Typha latifolia*), bulrush (*Scirpus* sp.), spike-rush (*Eleocharis* sp.), and bur-reed (*Sparganium* sp.), and water plaintain (*Alisma sp.*). These species occur at different places in the CSNM (in streams, stockponds, and the Parsnip Lakes) depending on current water depth and substrate.

Ecological Interactions within Diversity Emphasis Area

Fire history and the local effects of fire exclusion are not well known. However, the role of fire in plant life-histories is well known. Grasslands, shrublands and woodlands are fire-dependent, and change if fire is excluded. Changes include altered distribution of species over the landscape, increased woody canopy cover with a resultant decrease in understory abundance and species diversity, increased duff accumulation, and reduced seed germination and production. These changes may be desirable or undesirable depending on management or ecological objectives.

Many of the changes caused by fire exclusion often facilitate future weed invasion. Increased canopy cover and deeper duff accumulation create more intense fires which could incinerate seeds and vegetative propagules. Increased physical dominance by an overstory (shrub, hardwood, or conifer) may suppress understory seed production. Any condition which reduces the abundance of native herbaceous plants or seedbanks would facilitate invasion by non-native weeds following a fire event, roadside disturbance, and in areas where livestock congregate

At lower elevations, particularly within the Agate Flat area, much of the grassland, shrubland and open woodland have an understory dominated by annual weeds. The literature indicates that annual grass dominated plant communities are extremely difficult to convert back to native vegetation. Annual grasses monopolize soil water and nutrients, and alter soil surface conditions that result in low native grass seedling establishment. Excessive duff accumulation by introduced annual grasses often makes a poor seed bed for native bunch grasses. Open communities at higher elevation retain more of their native herbaceous species, although they may still be susceptible to weed invasion.

The open grasslands, shrublands and woodlands of the Scotch Creek RNA and other CSNM areas are a testament to the invasive abilities of yellow starthistle (map 19), even in the absence of recent grazing. The source of this invasion by weedy species is from adjacent infestations on uncontrolled grazing areas along the California border. High elevation meadows surrounded by high canopy conifer communities appear particularly impacted by past livestock use. Many high elevation meadows retain a native herbaceous component.

The shrink-swell characteristics of the clay soils that are so prevalent in the CSNM are weed friendly. The eradication of weeds and the establishment of native plants is difficult because of the churning action of the soil, the impenetrable nature of the dry soil, and the lack of soil pore space.

Few shrublands have experienced fire in the past few decades. Most existing shrublands dominated by wedgeleaf ceanothus or manzanita could be described as decadent, since these species are not long-lived and reproduce from refractory seedbanks needing heat scarification to induce germination. Other shrub species (birchleaf mountain-mahogany, bittercherry, Klamath plum, and chokecherry) all resprout from root crowns after fire.

Oak woodlands intergrade with shrublands as well as grasslands. Where hardwoods exist within a matrix of shallow soils, the ecology of the understory approximates that of grasslands. Where mixed shrubs and oaks combinations occur, the plant community ecology mirrors that of shrublands. While the oaks and other hardwoods resprout following fire, intense fires following years of litter and fuel accumulation may result in the local extirpation of woody species. Since the native herbaceous component is frequently concentrated below oak canopies, the loss of isolated hardwoods could result in a decline of the native herbaceous component.

Several of the special plant communities described in this document are also considered fire-dependent. The rosaceous chaparral is dominated by members of the rose family. All are known to resprout following fire or surface disturbance. Studies of annual growth rings derived from the Scotch Creek RNA rosaceous chaparral suggest that members of the rose family are able to maintain themselves through resprouting in the absence of fire. However, longer term dominance by Oregon white oak, a longer lived and physically dominant member of the plant community, is likely after hundreds of years of the absence of fire.

The mix of Oregon white oak and western juniper is intriguing, since Oregon white oak is resistant to fire, while juniper is extremely susceptible to fire. Two hypotheses might explain the coexistence of these species. The plant community may have arisen as a result of fire exclusion. Juniper could thus be considered to be an invasive component of formerly oak dominated plant communities. Alternatively, the trees coexist on a matrix of fire-safe and fire-prone sites. In this case, juniper would be relegated to rocky or shallow soils unable to support an understory of fuels facilitating the spread of fire. It is likely that both of these scenarios apply. The long history of local use of fire would have extirpated juniper from the landscape if fire-safe areas did not exist. Young juniper can also be observed as an understory component along the edges of black oak and Oregon white oak gallery forests along Scotch Creek. The latter situation could only occur with fire exclusion.

Semi-wet meadows and wet meadows have been impacted by past livestock use. While the composition and structure of these communities may have been noticeably altered, the moist edaphic conditions usually prevent the invasion of non-native weeds, with the exception of introduced non-native forage grasses. Proper grazing management practices could allow these plant communities to recuperate and provide the important ecological functions and rare plant/wildlife habitats of the past. Semi-wetlands and wetlands have also been impacted by roads and by off-road vehicles use. In some cases, the restoration of hydrological functioning may be necessary for full plant community restoration.

Riparian areas show similar impacts including excessive historical livestock use, roads, and conversion to irrigated pastures in the former Box-O Ranch area. Changes in hydrological functioning may prevent the attainment of historical conditions, particularly in areas where water has been diverted, or streams have become channelized or incised. The development of a healthy woody riparian component is of primary importance to improve water quality, particularly along Jenny Creek. Time series photographs indicate considerable improvement in riparian areas over the past 20 years.

Rocky outcrops and rocky meadows usually retain their native flora. The lack of herbaceous component makes these naturally fire-free communities. Lack of herbaceous forage make these communities unattractive to cattle, although they may have been heavily impacted by historical sheep browsing. However, the open nature of these sites invites the use of off-highway vehicles, this is particularly evident in the Pilot Rock area.

Conifer Plant Communities

Old-Growth Emphasis Area

The Old-Growth Emphasis Area (OGEA) consist of approximately 23,903 acres of land within the CSNM which is presently late-successional habitat and old-growth (LSOG) coniferous forest or is capable of becoming late-successional habitat and old-growth forest. Before the establishment of the CSNM, most of the Old-Growth Emphasis Area was identified as the Jenny Creek Late-Successional Reserve (LSR). The Old-Growth Emphasis Area is an important corridor in providing a key link between LSRs in the Cascade and Klamath Mountains (map 52).

Past Timber Management Practices

The first timber harvesting in the CSNM occurred around the turn of the century with economic selection for the best quality old-growth ponderosa pine, sugar pine and Douglas-fir trees (Larsen 1976). The Oregon and California Act of August 28, 1937 established timber production as the primary use of BLM forest lands in western Oregon.

Large scale salvage logging, partial harvests, and selective logging began in the 1940s to provide ammunition shell crate boxes. During the 1950s and 1960s, shelterwoods, a few seed trees and clearcuts, and group selection harvesting was practiced. After harvest, individual seed trees were usually lost to high winds common at these upper elevations and, over time, these regeneration cuts came to resemble clearcuts. By the 1970s, logging practices shifted from "mortality-salvage"/selection operations to more and larger regeneration harvesting as three-step shelterwood harvest system was generally practiced. LSOG stands were often entered as part of large-scale developmental sales. These sales were planned in order to enter an "undeveloped" area with some regeneration harvest to establish the road systems for future sales. The 1980s saw a continued increase in clearcutting despite recognized problems with reforestation as a result of these practices (Minore 1978). Within the OGEA lands, approximately 83 percent has a timber harvest history and approximately 6 percent has had some form of regeneration harvest that has produced plantations. Timber sales have involved removal of significant LSOG forest components in the Chinquapin Mountain, Beaver Creek, and Lincoln Creek areas in the late 1980s. Harvesting stopped in 1994 with the designation of the Jenny Creek LSR as a result of the Northwest Forest Plan. The regeneration harvested areas are occupied by young even-aged pure pine plantations. The clearcutting on private lands both within and adjacent to the CSNM involved the removal of whole sections of LSOG forest at a time and most regenerated as pure pine plantations. Private forest lands continue to be clearcut and most lands that have not been clearcut have been harvested too heavily to continue functioning as suitable Type 1 & 2 habitat. Some may function marginally as dispersal (type 5) habitat.

Plant Community Description

Mixed Conifer

There is no clear transition at higher elevations between the Mixed Conifer Zone and the White Fir Zone. The Mixed Conifer Zone is found in the Upper Tyler Creek, Baldy, Lower/Middle Jenny Creek and Keene Creek Subwatersheds between 2,500 and 4,200 feet elevation. The Mixed Conifer Zone landscape pattern is coarse grained because of interspersed shrublands, meadows, clearcuts, and forestland.

The Mixed Conifer Zone supports a variety of conifers including Douglas-fir (*Pseudotsuga menziesii*), white fir (*Abies concolor*), ponderosa pine (*Pinus ponderosa*), sugar pine (*P. lambertiana*), incense cedar (*Calocedrus decurrens*), Pacific yew (*Taxus brevifolia*), and western juniper (*Juniperus occidentalis*). Douglas-fir is the most common conifer with sugar pine, ponderosa pine, and incense cedar also present in the overstory of mature stands. In mature stands, white fir (and Douglas-fir with enough canopy gaps) dominates other understory conifers, which indicates that it is the climax species. Before 1910, more frequent fires prevented the more flammable, shade tolerant white fir from becoming a dominant climax species at lower elevations. As a result of fire cessation, a shift toward dense stands of white and Douglas-fir at the expense of sugar pine, ponderosa pine, and incense cedar has occurred.

Much of the Mixed Conifer Zone and all of the white fir zone in the CSNM would be classified with Atzet et al. (1996) the white fir series made up of several white fir (ABCO) associations. White fir associations are recognized by a high rate of constancy (the percent of plots with a given species present) among understory trees. In some plant communities, Douglas-fir might have 100 percent constancy in the overstory but would be considered a white fir association because 100 percent constancy of white firs in the understory.

White Fir Series

Atzet et al. (1996) WHITE FIR-INCENSE CEDAR/WESTERN STARFLOWER (ABCO 44). This association is particularly well represented in the northern part of the Monument. Douglas-fir, white fir (*Abies concolor*), incense-cedar, and sugar pine are the main overstory trees. White fir is the main constituent among the understory trees and has increased to the detriment of the less shade tolerant sugar pine, Douglas-fir, and incense cedar with lack of fire as an important ecosystem factor. Sugar pine and incense cedar quickly fill in canopy gaps caused by blow-down white fir and Douglas-fir that have succumbed to *Phellinus weirii* and other root rot infections. Sugar pine, in many associations, often appears as the long-term dominant continuing to grow as generations of white fir and Douglas-fir perish from fire or root rot. Sugar pine usually occurs as isolated individuals and never in solid stands. White fir stocking levels have increased compared to other conifers in the area because of fire suppression and lack of Native American burning practice. Under even the lightest fire regimes, young white firs are fire sensitive because of their low branches that sweep to the ground creating fuel ladders to the crowns and relatively thin resinous bark.

South of Keene Ridge mixed conifer forests tend to occur as more isolated stands as opposed to the more contiguous stands located to the north. Stands south of Keene Ridge are often surrounded by non-forest grassland and shrubland plant communities while stands to the north are fragmented by historic logging practices. The conifer stands south of Keene Ridge are distinctive as biologically diverse islands and represent unique isolated communities that are the last forest stands in the Klamath physiographic region. Conifer forest linkage with the Sierra Nevada Mountains occurs further to the east through the eastern Cascades.

Several variants of mixed conifer stands found as islands are of note south of Keene Ridge and Pilot Rock. Below Pilot Rock are stands of Douglas-fir with a large white fir and incense cedar component. Further south and lower in elevation are stands with more of a pine component. Near the California border are stands with both a large dominant ponderosa pine component and a healthy pine understory. Throughout this area are open pine (mixed conifer stands) that grade into woodland pine-oak communities. Many of the mixed conifer stands have extended marginally (ecotonal or transition zones) into non-forest communities in the absence of fire. Another mixed conifer variant occurs in Oregon Gulch (see Oregon Gulch RNA). All of the mixed conifer variants described are distinctive as biologically diverse islands and represent unique isolated plant communities that need further study.

Connectivity

Connectivity is a measure of the extent to which conditions among habitat, in this case specifically late-successional and old-growth (LSOG) habitat, can provide for breeding, feeding, dispersal, and movement of a species (LSOG-associated wildlife, fish and plant species). Habitats for providing these functions are described in the wildlife section of this chapter.

The OGEA was previously identified as the Jenny Creek LSR. This area was part of a large network of LSRs in the Oregon Cascades, Northern California Cascades, Siskiyou Mountains and is located at one of two connectivity "hotspots" in Oregon (the other is Galesville LSR). These LSRs provide a vegetative link for Northern Spotted Owls to move from the Oregon Cascades to the Oregon and California Siskiyou Provinces. The baseline vegetation (Table 2-18) and habitat types (Table 2-14) are used as a reasonable representations of the connectivity that exists on the landscape.

Identifying an area as an OGEA does not automatically transform the area into functional habitat for the array of plant and animal species associated with the LSOG habitat. Fragmentation of the LSOG habitat within the OGEA has produced breaks in habitat that can be larger than some species are willing to cross. Enhancing connectivity by protecting existing habitat and avoiding further degradation of existing LSOG habitat should be a priority in the CSNM.

The ability to assess the effect of connectivity habitat on the specific persistence of terrestrial species is limited by incomplete information for most wildlife species on dispersal capabilities, genetic interactions, and demographic parameters that influence successful dispersal of a species. Despite the lack of definitions, tools and data to assess connectivity, the ability of a landscape to provide for species movement between refugia is a persistent concern in addressing ways to manage for LSOG habitat. There is little evidence that the CSNM has ever played a major role in the east-west plant and animal migration although it does provide a relatively undisturbed east-west corridor for local animal movement, with the exception of the Interstate Highway.

Current Stand Conditions

Most recently, forest vegetation has been influenced by timber harvest and fire exclusion. This has caused changes in structure, tree sizes and habitat. Mixed conifer forests account for approximately 93 percent of the forests in the CSNM. Therefore most of the following discussion pertains to mixed conifer types. The remaining 7 percent is in white fir types which are more influenced by root rots as opposed to fire as a historic disturbance agent. Stand conditions are first discussed by size class and then by ecoregion and habitat type. The stand conditions are discussed in two ways because the Forest Operations Inventory identifies forest stands by size while habitat types are defined by tree size, canopy closure, stand structure and ecoregion. The use of ecoregion and habitat description allows for assessing different forested plant communities throughout the OGEA. This cannot be accomplished using dominant tree sizes only.

Current Stand Condition by Size Classes

Mature/Oldgrowth (21" + DBH)

Mature old-growth stand conditions occupy approximately 15,000 acres in the OGEA. The size class refers to the dominant size class found on site. Dominant tree age tends to exceed 150 years. The majority of these mature old-growth stands make up the LSOG habitat (habitat type 1 & 2) with the remainder being habitat type 5. Stand conditions only partially describe habitat type (see wildlife section for description of habitat type). In the OGEA approximately 83 percent has been entered for timber harvest. As a result, stands are often represented by groups or single individual large mature trees at varying densities. Trees species composition within the stands has shifted from pine and Douglas-fir domination towards white fir. Tree canopy is discontinuous with many gaps created by timber harvest. Gaps are occupied by a number of species, but white fir is the most common. Often only 6-8 mature trees are found per acre. Growth rate demonstrated by increment coring shows a slowdown from historic growth rates. Understory subdominant trees are often young in age having ingrown since timber harvest and/or the last fire event. Stands that are un-entered (approximately 4,000 acres) or that have been lightly entered still retain high densities of mature trees that are similar to historic levels. Most of the understory trees are white fir and are commonly at levels exceeding historical conditions. Levels of root rot and insect infestation are thought to be higher as a result of species shifts and increased tree densities. Pine are at risk of beetle infestation due to these higher tree densities. Recent observed wildfire behavior in the Monument indicates high rates of mortality of even the largest mature trees and potential stand replacement when wildfire occurs due to excessive ground and ladder fuels and heating in the white fir component.

Mid- Seral (11-21" dbh)

Mid-seral forest stands in the OGEA are 30-120 years of age. Most are habitat type 5. Some of the younger stands are habitat type 3. They tend to have one to two age classes and are mostly composed of Doug-fir and white fir. Many of these originated as even age stands just prior to wildfire suppression beginning around the turn of the century. Most have been entered, particularly in areas within stands that have a component of larger trees. Gaps are common. Multiple canopy layers are not as notable as in the mature stands because of the more even aged nature of these stands. Growth rates may be fairly good, but are hampered by ingrowth of young white fir and surrounding trees of the same age. Many of these stands are growing at a higher density than stands that historically developed into LSOG. The pine that occur in these stands are often stressed by surrounding high densities of white fir making them a high risk for beetle infestation. Excessive fine fuels have accumulated during mortality of young trees resulting in a higher risk of stand replacement during wildfire events.

Poles (5-11" DBH)

A fairly small amount of the OGEA is represented by pole sized stands. Most of these are natural stands that are extremely dense with stocking levels up to 1,500 trees per acre. Some have a mixed conifer and fairly open yet clumpy nature due to over story removals. Tree age varies, they tend to be less than 60 but can exceed 100 years. Growth in these stands is relatively slow. These stands will not develop into mid-seral or late-seral stages in the near future without management intervention. These stands tend to be habitat type 3 stands because the tree size is presently too small to provide for nesting, roosting, foraging, or dispersal but has the potential to become LSOG habitat in the future. Very few larger trees are found within these stands. Predominant species are Doug-fir and white fir. Brush is common in the understory as it has not yet been shaded out. Given the age and size of trees in these stands wildfire would probably be a stand replacement event in most cases.

Early Seral /Plantations

Most of these forest stands are habitat type three and are monocultural even aged pine plantations that resulted from planting clearcuts. The majority of these are less than 30 years old. They are overstocked and should have been thinned during the last decade. Growth rates are showing a slowing trend as the stands close in. Stocking levels tend to be 250 to 500 trees per acre. Very little natural ingrowth of other mixed conifer species is occurring. These plantations often exceed 30 acres in size. Unless thinned these stands will continue this slow growth trend resulting in overstocking and excessive basal area. This will cause an increase in beetle and wild fire risk as well as an inability to release and develop into stands with LSOG characteristics .

Current Stand Conditions by Ecoregion and LSOG Habitat Types

As a result of being located at the intersection of the Cascade Mountains and the Klamath Mountains there is considerable variation in physiographic characteristics. The Oregon Natural Heritage Program (ONHP) in its 1998 plan to conserve Oregon's natural heritage and protect its biodiversity adopted an ecoregion concept. These ONHP Ecoregions are described by several ecological factors or characteristics and each ecoregion is designated by a geographic name and number. The ONHP Ecoregions are used in this Plan to define important biophysical relationships in the CSNM including the coniferous forest (Appendix T) .

The CSNM overlaps portions of three Level III Ecoregions: Klamath Mountains (78), Cascades (4), and Eastern Cascades Slopes and Foothills (9) (Pater et al. 1997a and 1997b and Natural Heritage Advisory Council 1998). These Level III Ecoregions are further subdivided into subordinate Level IV Ecoregions which in the ONHP classification system uses the Level III number plus a lower case letter to distinguish each Level IV Ecoregion. There are four Level IV Ecoregions found in the Monument: Southern Cascades (4g), Southern Cascades Slopes (9i), Siskiyou Foothills (78b) and Klamath River Ridges (78g) (map 3).

Disturbance Agents and Processes

The first disturbance section lists individual insects and diseases found having an effect in the OGEA. The second section discusses and illustrates processes: Current vs. historic.

Forest Insects and Disease

Insects and pathogens are often predictable agents of change currently present in the CSNM and surrounding areas. Individually or acting together they can decrease growth and cause mortality in individual trees. At a landscape level, they influence stand structure, composition, and function within forest ecosystems by creating canopy gaps, altering plant succession, creating decay columns and snags, which contribute woody material to the forest floor and streams. Insect and disease influences may be beneficial or detrimental to development and maintenance of late-successional or old-growth conditions, depending upon the mix of hosts, insects, and pathogens; current weather patterns; fire history; host species composition; host vigor; and past management activities. The following is a description of the diseases and insects most commonly found in the CSNM.

Laminated Root Rot

Laminated root rot, caused by *Phellinus weirii* (Basidiomycota), is the most damaging tree disease in the CSNM. This disease is found on at least 3,000 acres of mixed conifer and white fir forest lands with a mix sugar pine and incense cedar and a white fir understory. On some sites, large, individual sugar pine have survived for 600 years, while generations of surrounding Douglas-fir and white fir grew, matured, and then succumbed to laminated root rot.

Laminated root rot has always been present at some level on these sites for centuries. Good examples of the establishment of shade intolerant pine and incense cedar in gaps left by the death of firs by laminated root rot are found in the Soda Jenny and Crane Prairie areas. Here, laminated root rot causes extensive growth declines, decay, and mortality among susceptible white fir and Douglas-fir. Lodgepole pine and sugar pine are tolerant, while ponderosa pine and incense cedar are resistant. Approximately 400 acres of LSOG forest in the area with laminated root rot were clearcut and planted to pine plantations. Eighty years of fire exclusion has caused a shift to dense stands of more intolerant white fire and Douglas-fir that stress the older pines and cedars. The last stand replacing wildfire event in this area was in 1910.

Annosus Root Disease

Annosus root disease caused by *Heterobasidion annosum* (Basidiomycota) damages white fir in the CSNM. Several incidences of *Annosus* root rot have been noted in cut over areas where it has colonized stumps from previous stand entries and infected conifer regeneration in the vicinity. Infection occurs when roots from healthy trees come in contact with infected root material. Ten or tewnty years after entry, a significant proportion of the associated stand and subsequent reproduction often shows a large proportion of *Annosus* infection mainly in the form of butt rot, windthrow, and stem breakage.

Other root or butt rot diseases observed in the area include shoestring root rot (*Armellaria mellea*) and velvet top (*Polyporous schweinitzii*). Black stain root disease (*Verticacladiella wagonerii*) was surveyed in 1986. No reported infection centers were observed on Douglas-fir or ponderosa pine because few Douglas-fir plantations of the age class (10-30 years) are found in the CSNM due to the severe frost problem associated with clearcuts.

White Pine Blister Rust

White pine blister rust on sugar pine is caused by *Cronartium ribicola* introduced from Europe around 1910. It causes top kill and flagging of small branches on large trees and mortality of poles, saplings, and seedlings due to girdling cankers. Seedlings from resistant parents are planted in partial cut stands and gaps. Significant sugar pine mortality has been observed on seedlings and saplings in several areas within the CSNM. Because sugar pine often seeds into gaps in mixed conifer stands, small sugar pine mortality is significantly altering future forest structure because incense cedar, white fir, and Douglas-fir fill these gaps instead. Presently, young sugar pine are not occupying these sites.

Common Heart Rot

Common heart rot or decay column causing pathogens include *Polyporous amarus* on incense cedar, *Phellinus pini* on Douglas-fir, and *Echinodontium tinctorium* on white fir. These necessary and beneficial fungi create habitat used by cavity nesters and dwellers. Heart rots usually do not cause mortality because they grow for decades with the maturing tree, forming cavities that provide nesting habitat for decades in late-successional stands.

Insects

Several primary tree killing insects are present in the CSNM including western pine beetle (*Dendroctonus brevicomis*) on ponderosa pine; mountain pine beetle (*D. ponderosae*), red turpentine beetle (*D. valens*) and pine engravers (*Ips spp.*) on sugar and ponderosa pine; Douglas-fir beetle (*D. psuedotsugae*) on Douglas-fir; and fir engraver (*Scolytus ventralis*) on white fir. Recently insect species associated with pine have significantly effected large old trees due to stress associated with dense stocking of white fir in the understory and drought. Sugar pine and ponderosa pine are being lost in many areas within the CSNM as a result of increased competition by white fir and subsequent insect attacks. Blister rust on sugar pine exacerbates insect attack. Fir engraver activity associated with root rots is another example of trees being predisposed to insect outbreaks due to an existing stress problem. Historic references record major beetle infestations from 1925 to 1934. Periodic and local infestations continue to occur over the area.

Dwarf Mistletoe

Dwarf mistletoe on Douglas-fir and white fir is common. The most significant impacts on the growth and survival occur in multi-storied Douglas-fir stands where partial cutting and fire exclusion have created uneven- aged stands resulting in higher infection levels and increased occurrence of Douglas-fir mistletoe (*Arcuethobium douglasii*). It is recognized by its aerial shoots accompanied by host stem swelling and multiple branching pattern called witches brooms. Some level of dwarf mistletoe in a stand is desirable for future old-growth tree character and structure, as well as spotted owl habitat. The Douglas-fir in particular develops brooms, which are important to wildlife. The large brooms that form over the course of several years on large old-growth trees are desirable habitat and irreplaceable in the short term. Development of old-growth character from heavily infected trees in overstocked understory is unlikely due to infection of the actively growing tops on intermediate to small trees. Historically, many of the smaller infected trees were removed from the stand by wildfires. Presently, infected understory trees are acting as fuel ladders that increase the likelihood of killing the larger overstory stand components. Areas in the CSNM, such as Fredenburg Springs, are good examples of the fuel ladder problem.

Other Diseases

Some additional diseases in hardwoods include a number of leaf blight fungi on madrone. These often occur in epidemic proportions over significant areas. They may be the result of drought and localized weather and generally have short term effects. Oak plant communities commonly have root rots such as *Armellarea mellea*. Various decay fungi inhabit long lived oaks. Lack of fire likely effects mast production and regeneration in oak communities. Recently sudden oak death (SOD) has been noted in Northern California. It is caused by a Phytopthora species that causes cambial cankers and has resulted in significant dieback in some areas. As yet no incidence on oak has been noted in Oregon. California black oak *(Quercus kelloggii)*, a common associate in the CSNM, has been found to be highly susceptible in California. The location of the CSNM and the common occurrence of oak woodland plant communities south of the Keene Creek Ridge just north of the California border and its proximity to the I-5 corridor make this area a prime candidate for (SOD) introduction in Oregon. Road closures and avoiding transport of infected plant materials will be essential in protecting these oak woodland plant communities.

Winds

High winds periodically cause windthrow in managed forest stands and natural stands. Blowdown is common on ridges especially when soils are saturated. Trees that are shallow rooted as result of high water tables have increased susceptibility to windthrow during storms, particularly where the stand has been recently thinned. Heavy snowfall accompanied by high winds during severe winter storms result in increased tree breakage and windthrow of white fir and other tree species. The most severe blowdown problems in the CSNM in recent history have been due to heavy thinning for shelterwoods. Clearcutting has exposed forest stand edges to direct wind resulting in increased blowdown. Open areas in rugged terrain exacerbate wind tunnel circumstances wherein windthrow at the edges of intact forest stands gradually erodes stand integrity. All of these situations contribute to fragmentation of intact forest communities.

Animal Influences

Most animal problems in the CSNM are associated with favorable habitat conditions created as a result of historic clearcutting. Only incidental problems have been noted in late-successional forests.

Pocket gophers (*Thomomys sp.*) have posed the most significant animal problem to reforestation on the CSNM. Historic clearcutting practices have converted old-growth or late-successional forests to grass fields. This is ideal habitat for gophers and, coupled with severe frost heaving, the only reforestation option is to plant lodgepole, Jeffrey and ponderosa pine. These are the only species that can survive successfully in what is now an early seral community. Heavy gopher infestation typically causes mortality of pine seedlings for up to five years and sometimes longer. Mortality has been as high as 90 percent of stocking in a single year. Gophers prefer fleshy or succulent roots and stems of herbaceous plants and trees, injuring tree seedlings by root pruning, stem girdling, and stem clipping. Replanting has been the normal procedure on these sites. Methods employed to control gopher populations include baiting with poison, trapping, and plowing. Success has been limited as gopher populations fluctuate rapidly due to weather, altitude, soil characteristics, and food quality and quantity. Coupled with increased acreage of pine plantations there has been an increase in porcupine populations that continue to girdle and top kill pine at a detrimental level up to 40 years of age. Reforestation is extremely difficult as is young stand management after clearcutting at the high elevations (white fir and mixed conifer communities) that characterize the CSNM.

Gophers provide food for a host of small and medium-sized predators, including spotted and great grey owls, coyote, and various snakes and weasels. They are suspected to play a role in maintenance of vernal mound (ground) topography outside LSOG communities.

Deer and elk often nip buds and browse seedlings or saplings, slowing down tree establishment in the process, but are generally not a large problem in this area. Cattle are only a problem in small areas where they congregate for shade and water. They are a positive factor in decreasing grass competition in pine plantations beyond 4 to 5 years in age where trees are too large to be trampled. Overall, cattle are not believed to be a significant problem to reforestation efforts within the CSNM.

Disturbance Processes

Current Trends vs Historical Processes

The management activities that most likely affect overall forest health are timber harvest, thinning of vegetation and prescribed fire. These activities change forest structural characteristics at the time of treatment. Disturbance agents are always a factor at the stand and landscape level. Disturbance agents will have various impacts depending on successional stages and plant communities affected. Management activities may aid in decreasing the relative impact of disturbance agents to historic levels over time and over the landscape. Past management has often increased impacts. A short overview of these processes is provided in Table 2-19 and is intended to show the relative impacts of disturbance processes. Map 20 (aerial insect surveys, 1995-99) and Map 21 (laminated root rot) show recent occurrences or presence in the OGEA. These maps illustrate the most obvious impacts that are currently occurring and their locations.

Stand structural characteristics change in response to disturbance agents and also determine to what extent a disturbance agent may alter stand development. For instance, lower densities in natural stands generally will result in lower levels of mortality due to beetles. Species composition will determine the extent host specific root rots effect future stand development. Often beetle-pathogen interactions occur together and are affected by density and species composition. Fir engraver/root rot interactions are common in the CSNM particularly in white fir plant communities and the more mesic higher elevation mixed conifer forest communities where white fir is found. As previously noted, most of the assumptions pertain to mixed conifer because mixed conifer plant communities make up 93 percent of the forest types found in CSNM while white fir accounts for 7 percent.

The overall disturbance processes in Table 2-19 are landscape level trends.

Table 2-19. Disturbance Agents and Processes

Disturbance Agent	**Current Processes**	**Historic Processes: Desired Future Condition**
Laminated Root Rot *(Phellinus weirii)*	Ramifies through the stand, large impact due to lack of older structure and resistant species. The organism is on the site indefinitely.	Forms gaps for intolerant species establishment, remains onsite indefinitely, affects only white fir and Doug fir, main disturbance agent in white fir plant communities. Gaps are filled by incense cedar and pine.
Annosus Root Rot *(Heterobasidion annosum)*	Heavy mortality of susceptible species (white fir) in previously entered stands, opens up stands, reduces basal area, decreases canopy, reduces stand structure.	Low natural levels, forms gaps, stumps treated when stands are entered to discourage spread.
Shoe String Root Rot *(Armellaria mellea)*	Causes mortality of most species particularly in dense stands where trees are stressed. Increased incidence due to logging damage and compaction occurs.	Acts in concert with other root rots at lower levels. Fewer trees are stressed and are then less susceptible to an often secondary pathogen.
Fir Engraver *(Scolytus ventralis)*	Heavy infestations in concert with root rots in dense stands. Risk is increased to larger forest areas.	Forms gaps, found at lower levels due to fewer overly dense stands, natural density reduction occurs. Root rot/ insect interactions occur at lower levels.
Mountain Pine Beetle *(Dendroctonus ponderosae)*	Causes heavy mortality of large mature sugar and ponderosa pine in overly dense mixed conifer stands.	Reduced levels of pine mortality due to decreased stand densities, less water stress and more vigorous trees. Reduced risks to infestation.
Western Pine Beetle *(Dendroctonus brevicomis)*	Causes heavy mortality of large and small ponderosa pine in dense stagnate mixed conifer stands.	Reduced levels of pine mortality due to decreased stand densities, less water stress and more vigorous trees i.e. reduced risk.
Wind; winter storm events and windthrow.	Increased windthrow due to heavy harvest treatments, previous clearcuts that created wind tunnels and edge effects due to cut stands adjacent to un-entered stands i.e. increased exposure.	Random windthrow events still occur, however effects are reduced on intact forests on the landscape.
Catastrophic fire effects	Without prescribed burning: high intensity stand replacement fires due to buildup of ladder fuels, fine fuels, CWD and snags.	With prescribed burning: low intensity mosaic fires which decrease the amount of fuels over the landscape at historic intervals.

Dead Wood

Large (greater than 16 inches in diameter) snags and logs are important distinguishing features within LSOG conifer forests. Many LSOG associated wildlife species are known to be associated with both vertical (snags) and downed coarse woody debris (dead wood). The occurrence of dead wood in forest ecosystems is quite variable because dead wood is created and destroyed in an variety of ways. Over time, mortality of individual trees or waves of tree mortality from disturbance events, such as windthrow, insects, disease, and wildfire, occur. Retention of snags and down woody debris is dependent on fire frequency and fire intensity, and on the decomposition rates of the various wood species present. Comparison of stand age to dead wood decay class from previous stands suggests that decomposition rates for large logs is about 80-100 years from decay Class 1 (recent dead) to decay Class 5 (advanced decay).

Snags

During the summer of 1998 sixteen 100-acre Northern Spotted Owl (NSO) Activity Centers in the area that is now the Monument were sampled for snags. With the exception of one activity center, 1,500 feet of fixed width (66 feet) belt transect were run in each activity center (approximately 2.27 acres of transect area per 100-acre activity center). The exception was one stand with only 1,300 feet sampled (snag density calculations for this site were adjusted). Only those snags greater than 8" dbh were included in this analysis. An assumption was made that the NSO Activity Centers represent the most functional LSOG habitat in the Monument, and as such the observed snag densities in those stands would be a logical basis for developing snag density targets for stands proposed for some kind of treatment. See Appendix JJ for a discussion of the target snag densities for stands in each ecoregion.

The 16 NSO sites sampled in the Monument are distributed quite evenly among the ecoregions with five sites in each of the three major ecoregions within the Monument (Siskiyou Foothills, South Cascades, and Klamath River Ridges) and one site in the minor South Cascade Slopes Ecoregion. (map 3)

The snag inventory recorded a total of 401 snags greater than 7.9" diameter at breast height (dbh). The snags were assigned to 5 decay classes in the field and 5 size classes during the analysis phase, see Appendix JJ. Descriptive statistics were calculated for the three major ecoregions within the Monument: Siskiyou Foothills, South Cascades, and Klamath River Ridges. The South Cascade Slopes Ecoregion contained only one sampled NSO site in the Monument. Consequently no descriptive statistics were calculated based on the data collected there.

Tables 2-20 through 2-25 display the results of the snag inventory including observed snag densities by species and size classes for each ecoregion.

Coarse Woody Debris

Coarse woody debris (CWD) has been identified as a key component of late-successional forests. This material performs many functions including providing foraging habitat for small, medium, and large mammals and many species of birds and invertebrates. Coarse woody debris also provides denning sites and hiding cover for most terrestrial vertebrates dwelling on the forest floor. Larger CWD is important for the development and function of forests; and because large diameter pieces of CWD have more durable heartwood than smaller pieces, they last longer. Large logs are key habitat components for many forms of wildlife; by disrupting air flow and providing shade, they insulate and protect various forest species.

Table 2-20. Observed Snags per acre within NSO Activity Centers in the Siskiyou Foothills Ecoregion within the Monument (5 sample sites)

Size Class (DBH)	Mean Snags Per Acre	Sample Standard Deviation	Mean Snags + one Standard deviation	Observed Range
8-15.9"	4.58	2.70	7.35	1.3-7.9
16-17.9"	0.5	0.48	0.98	0-1.3
18-19.9	0.24	0.22	0.46	0-0.4
20-21.9	0.26	0.40	0.66	0-0.9
22-23.9	0.08	0.18	0.26	0-0.4
24-25.9	0.16	0.22	0.38	0-0.4
26-27.9	0.08	0.18	0.26	0-0.4
28-29.9	0.08	0.18	0.26	0-0.4
30-31.9	0	0	0	0-0
32-33.9	0.16	0.22	0.38	0-0.4
34-35.9	0.16	0.22	0.38	0-0.4
36-39.9	0.08	0.18	0.26	0-0.4
40-49.9	0.08	0.18	0.26	0-0.4
50+	0	0	0	0
8"+	6.46	5.36	11.89	
16"+	1.88	2.66	4.54	
20"+	1.14	1.96	3.1	

Mean snags per acre 6.6 (n = 5 sites)

Sample standard deviation of snag density 3.80 (n = 5 sites)

Snag density at most snag-rich site 10.6 per acre

Snag density at snag-poorest site 1.8 per acre

Table 2-21. Distribution of Snags within Siskiyou Foothills Ecoregion

Decay Class	Percent Observed		Snag Species	Percent Observed
1	21.7		Sugar Pine	0.0
2	8.7		Ponderosa Pine	13.0
3	26.1		White Fir	26.1
4	26.1		Douglas-fir	52.2
5	17.4		Incense Cedar	4.3
			Black Oak	4.4
Total	100.0			100.0

Table 2-22. Observed snags per acre within NSO Activity Centers in the Southern Cascades Ecoregion within the Monument (5 sample sites)

Size Class (DBH)	Mean Snags Per Acre	Sample Standard Deviation	Mean Snags + one Standard Deviation	Observed Range
8-15.9	7.96	6.16	14.12	2.2-17.0
16-17.9	1.08	0.93	2.01	0.4-2.2
18-19.9	0.92	0.70	1.70	0.-2.0
20-21.9	0.28	0.41	0.69	0.-0.9
22-23.9	0.44	0.32	0.76	0.-2.0
24-25.9	0.46	0.48	0.94	0.-1.0
26-27.9	0.44	0.62	1.06	0.-0.3
28-29.9	0.78	0.77	1.55	0.-0.4
30-31.9	0.26	0.40	0.66	0.-0.9
32-33.9	0.44	0.32	0.76	0.-0.9
34-35.9	0.34	0.19	0.53	0.-0.4
36-39.9	0.88	0.66	1.54	0.-1.8
40-49.9	0.34	0.37	0.71	0.-0.9
50+	0.52	0.48	1.00	0.-1.3
8"+	15.14	12.81	28.03	
16"+	7.18	6.65	13.91	
20"+	5.18	5.02	10.2	

Mean snags per acre 15.20 (n = 5 sites)
Sample standard deviation of snag density 5.73 (n = 5 sites)
Snag density at most snag-rich site = 24.5 per acre
Snag density at snag-poorest site = 10.1 per acre

Table 2-23. Distribution of Snags within Southern Cascade Ecoregion

Decay Class	Percent Observed	Snag Species	Percent Observed
1	38.7	Sugar Pine	3.8
2	27.5	Ponderosa Pine	12.5
3	8.7	White Fir	57.4
4	18.8	Douglas-fir	17.5
5	6.3	Incense Cedar	8.8
		Black Oak	0.0
Total	100.0		100.0

Table 2-24. Snags per acre within NSO Activity Centers in the Klamath River Ridges Ecoregion Within the Monument (5 sample sites)

Size Class (DBH)	Mean Snags Per Acre	Sample Standard	Mean Snags + one Standard Deviation	Observed Range
8-15.9	7.02	2.26	9.28	5.2-10.5
16-17.9	1.48	0.65	2.13	2.6-0.9
18-19.9	0.78	0.64	1.42	0-1.7
20-21.9	0.88	0.53	1.41	0-1.3
22-23.9	0.60	0.50	1.10	0-1.3
24-25.9	0.86	0.53	1.39	0.4-1.8
26-27.9	0.50	0.48	0.98	0-1.3
28-29.9	0.34	0.56	0.90	0-1.3
30-31.9	0.70	0.50	1.20	0-1.3
32-33.9	0.18	0.40	0.58	0-0.9
34-35.9	0	0	0	0
36-39.9	0.26	0.40	0.66	0-0.9
40-49.9	0.24	0.22	0.46	0-0.4
50+	0.08	0.18	0.26	0-0.4
8"+	13.92	7.85	21.77	
15"+	6.9	5.59	12.49	
20"+	4.64	4.3	8.94	

Mean snags per acre 14.10 (n = 5 sites)
Sample standard deviation of snag density 2.94 (n = 5 sites)
Snag density at most snag-rich site 17.2 per acre
Snag density at snag-poorest site 9.7 per acre

Table 2-25. Distribution of Snags within Klamath River Ridges Ecoregion

Decay Class	Percent Observed	Snag Species	Percent Observed
1	38.0	Sugar Pine	5.1
2	22.7	Ponderosa Pine	3.8
3	11.4	White Fir	62.0
4	15.2	Douglas-fir	19.0
5	12.7	Incense Cedar	10.1
		Black Oak	0.0
Total	100.0		100.0

Large materials (e.g., coarse woody debris, stems, large branches) are important for healthy soil biology because they influence soil nutrient availability, soil moisture, and population levels of soil organisms. Soil organisms interact with each other and their environment while playing a fundamental role in many site processes. Soil organisms promote carbon cycling, nutrient transfer, water availability, vegetation vigor, and maintenance of soil structure. Most biological fixation of nitrogen in ecosystems occurs because of soil organism activity. Mycorrhizal fungi increase the absorbing surface area of roots, which directly increases the total soil volume that can be explored for nutrients and water. Mycorrhizal fungi and other microbes effect soil structure by helping bind soil particles into water-stable aggregates which, in turn, create soil volume with stable and adequate pore space. Soil pores are essential for adequate movement of water and air required by plants and soil organisms (USDI 1995b, p.109). Many forest dwelling wildlife species depend on soil organisms and/or fungi for food sources.

In 1998 coarse woody debris information was collected in the four ecoregions of the former Jenny Creek LSR. These sampling sites were located in the same NSO Activity Centers where the snag inventory discussed above was performed. The CWD data presented below represents the status of coarse woody debris in some of what are believed to be the most functional late successional stands in the Monument. Sampling along transects was conducted on five sites in each of the respective ecoregions except for the Southern Cascade Slopes which only contained one sample site in the Monument. Based on the current information, target levels for coarse wood in the respective ecoregions were calculated. Table 2-26 display the amount of coarse woody debris by ecoregion that is 16 inches or greater in diameter (large end) and at least 16 feet in length in decay class 1 or 2. Table 2-26 also displays current average numbers of snags available by for potential future coarse wood recruitment.

Most of the CWD in the NSO Activity Centers is in the older decay classes. There is some very large wood in the NSO Activity Centers. These large pieces are extremely valuable components of the ecosystem. They perform all of the functions of CWD and do it better and longer than smaller logs.

Special Status Plant Species

The Cascade-Siskiyou National Monument, located at the confluence of the Klamath, Cascades, Eastern Cascade Slopes and Foothills Ecoregions, has a unique geology, climate, and topography that contributes to the presence of many rare and endemic

Table 2-26. Coarse Woody Debris by decay class measured in NSO Activity Centers (16 NSO Actvity Centers sampled)

Large End Diameter (inches)	Mean number of logs and Mean number linear feet per acre										Total Mean Number of Pieces and Feet	
	Decay Class 1		Decay Class 2		Decay Class 3		Decay Class 4		Decay Class 5			
	Logs #	linear ft	Logs #	linear ft	Logs #	linear ft	Logs #	linear ft	Logs #	linear ft		
16-27	0.5	21'	0.8	31'	0.3	17'	0.5	23'	0.2	6'	2.3	98'
28-39	0.0	4'	0.2	11'	0.2	13'	0.3	8'	0.1	4'	.8	40'
40+	0.0	6'	0.1	04'	0.1	10'	0	2'	0	0'	.2	22'

In Table 2-26, there is a "0" for the average number of pieces per acre, but a value for the number of linear feet per acre is given. This apparent inconsistency is due to averaging and rounding.

Table 2-27. Summary of Coarse Woody Debris within NSO Activity Centers by Ecoregions

Ecoregion	Down Coarse Wood Debris >16"dia. & >16' Decay Classes 1 or 2 (Ave. # pieces/acre)	Standing snags >16"dia. & >16' (Ave. # snags/acre)
Siskiyou Foothills (78b)	**1.4**	1.9
Southern Cascades (4g)	**4.2**	7.2
Klamath River Ridges (78g)	**5.2**	6.9

plants and fungi. Extreme southwest Oregon and adjacent northern California have one of the highest rates of plant endemism in the United States (The Nature Conservancy 2000). There are 24 species of Special Status Plant Species (Table 2-28) known to exist within the Monument, including one federally endangered plant, Gentner's fritillary (*Fritillaria gentneri*). Bureau Special Status Species include species that are federally listed or proposed, Bureau Sensitive, Assessment or Tracking species. Several species of fungi and plants that have had status under the Northwest Forest Plan (USDA 1994a) as Survey and Manage are also listed as Bureau Special Status Species (See Appendix Z).

Following the definition in BLM 6840 Policy, Sensitive species include those that could easily become endangered or extinct within the State. These include vascular plants, bryophytes (mosses and liverworts), and rare fungi. Sensitive species are restricted in range and have natural or anthropogenic threats to survival. Bureau sensitive species are not federally listed, however, they are eligible for Federal or State listing or candidate status. Sensitive species are designated by the BLM State Director so as to manage to preclude the need for federal listing under the Endangered Species Act. The Sensitive species lists are tiered to the State of Oregon fish / wildlife / botanical agencies' and the Oregon Natural Heritage Program (ONHP) designations. Plants that are State candidates or ONHP List 1 are considered Bureau Sensitive (USDI 2000c).

BLM Assessment species are plants that are currently not eligible for official federal or state listed status but are of concern in Oregon and that may, at a minimum, need

[redacted]	[redacted]	[redacted]	[redacted]
Asarum wagneri	green-flowered ginger	T, SC	G4/S4
Astragalus californicus	California milk-vetch	A	G4?/S1
Bondarzewia montana	Bondarzew's polypore	T	
Calochortus greenei	Greene's mariposa lily	S, SC	G2/S2
Carex serratodens	saw-toothed sedge	A	G4?/S2
Cypripedium fasciculatum	clustered lady's-slipper	S, SC	G3G4/S2
Cypripedium montanum	mountain lady's-slipper	T	G4G5/S4
Fritillaria gentneri	Gentner's fritillary	SE, FE	G1/S1
Fritillaria glauca	Siskiyou fritillary	A	G4/S2
Hackelia bella	beautiful stickseed	T	G4/S1
Hieracium greenei	Greene's hawksweed	T	G4/S?
Iliamna bakeri	Baker's globe mallow	S	G3?/S2
Isopyrum stipitatum	dwarf isopyrum	A	G4?/S2
Lathyrus lanszwertii var. tracyi	Tracy's peavine	T	G?T3/S1
Limnanthes floccosa ssp. *bellingeriana*	Bellinger's meadow-foam	S, SC	G4T2/S2
Microseris laciniata ssp. *detlingi*	Detling's microseris	S	G4T2/S2
Monardella glauca	pale monardella	T	G4G5/S?
Nemacladus capillaris	common nemacladus	A	G4/S1
Perideridia howellii	Howell's false-caraway	T	G4/S3
Pithya vulgaris	common pithya	T	
Plagiobothrys figuratus ssp. *corallicarpus*	coral-seeded allocarya	S, SC	G5T1/S1
Plectania milleri	Miller's cup-fungus	T	G3?/S2
Ribes inerme var. *klamathese*	Klamath gooseberry	T	G5T3?/S?
Solanum parishii	Parish's nightshade	T	G4/S?

*A = BLM Assessment species in Oregon G = Global rank SE = Oregon State endangered FE = Federally endangered
S = BLM Sensitive species in Oregon T = Trinomial (subspecies, variety, race) rank S = State rank
SC = Oregon State candidate T = BLM Tracking species in Oregon
1 = Critically imperiled because of extreme rarity or because it is somehow especially vulnerable to extinction or extirpation.
2 = Imperiled because of rarity or because other factors demonstrably make it very vulnerable to extinction (extirpation).
3 = Rare, uncommon or threatened but not immediately imperiled. 4 = Not rare and apparently secure but with cause for long-term concern.
5 = Demonstrably widespread, abundant, and secure. ? = Not yet ranked or assigned rank is uncertain.

protection or mitigation in BLM activities. These species are ones tracked by the Oregon Natural Heritage Program as List 2, 3, or 4s. Where possible, measures should be taken in project planning to protect the species (USDI 2000c).

Bureau Tracking Species are plants and fungi that more information is needed to determine their rarity status. To enable an early warning for species which may become of concern in the future, data is collected to determine their status within the state. This would include species that are rare but currently stable, and species that are declining in numbers or habitat but are still too common to be proposed as federally or state listed, Bureau Sensitive or Assessment species. While special protection or mitigation is discretionary for Tracking species, occurrence data is collected to determine its rarity status.

Federally Listed Plants

Gentner's fritillary (*Fritillaria gentneri*) was listed by the U.S. Fish & Wildlife Service as endangered in January 2000 (USDI 1999b). Consultation with the U.S. Fish & Wildlife Service on any federal action that may affect this species or its habitat is required. Gentner's fritillary is a southern Oregon endemic that is primarily known from the area around Jacksonville, the Little and Middle Applegate River, east to Big Butte Creek near Butte Falls, and west to near Merlin, Oregon. The single site known in the Monument is the most southerly occurrence for this species and was discovered in 1990 in the Dutch Oven drainage.

This rare lily grows in lower elevation (less than 4500 feet) mixed conifer/hardwood forests, open oak woodlands, chaparral, and grasslands, often in the transitional habitat, or the 'ecotonal edge' between these discrete plant communities, often along ridgelines (USDI 1999a; Brock and Callagan 2000). As a result of its proximity to lower elevation valley bottoms and foothills, this plant is susceptible to habitat alteration from agricultural uses, rural and urban development, impacts from grazing, road building, forest management, and recreation, especially on private lands. While this species has protection on Federal and State public lands, the Endangered Species Act of 1973 does not provide protection for this species on private lands.

This lily is rather large, between 8 - 34 inches tall with bright reddish-purple flowers (Brock and Callagan 2000). This species has likely experienced impacts from incidental collection (wildflower picking) by recreationists (Brock 2000). This species looks very similar to several 'common' red fritillaria lillies, (*Fritillaria affine and F. recurva*), making cursory identification by lay persons problematic. Unless it is flowering, the rare Genter's fritillary is nearly indistinguishable from the more common species. These species often occur together in the same habitats. Most known populations of Genter's fritillary are small with few reproducing individuals. Monitoring of Gentner's fritillary sites on federal lands have found that 34 out of 41 sites (83%) contained, on average, less than 10 flowering plants in any given year (Brock and Callagan 2000). Only two populations had more than 100 flowering plants in any given year since monitoring began in 1998.

The Genter's fritillary population in the Monument has had between seventeen to thirty-eight flowering plants over the last three years of monitoring. There are hundreds of vegetative plants at the site, but what percentage is actually Gentner's fritillary is not known as both of the common fritillary's are also present. The habitat at this site is a fairly distinctive ecotone between a dry, oak woodland / mountain mahogany chaparral, and a Douglas-fir - white fir / serviceberry plant community along a moist riparian area. It occurs in an area that is a mosaic of deep soils and shallow, rocky spots, up out of the riparian zone. Some incidental surveys have occurred in the immediate area, however, systematic surveys for this species have not occurred in large portions of the Monument.

The Monument is outside the known range of the federally endangered plant McDonald's rockcress (*Arabis macdonaldiana*), and no habitat is present [serpentine outcrops] (USDI 2000c). The Monument is also outside the known range for 2 federally proposed species, large-flowered wooly meadowfoam (*Limnanthes floccosa ssp. grandiflora*), and Cook's lomatium (*Lomatium cookii*) (USFWS, 2000f). These species were proposed for listing in May 2000, and are known for the Agate desert area north of Medford, and in the Illinois Valley near Cave Junction. These species are not expected to occur here. If these species are documented in the future within the Monument they will be managed according to the Endangered Species Act.

Bureau Special Status Plants

Green-flowered ginger(*Asarum wagneri*) is known only from southwest Oregon in Douglas, Jackson, Josephine and Klamath counties. It occurs near Chinquapin Mountain and in areas near Howard Prairie Lake in the Monument. This species, while locally restricted, can be quite abundant in certain habitats. It is most often found in mixed conifer communities with white-fir, Douglas-fir, ponderosa pine, sugar pine and white pine. It can occur in a variety of successional states, including in areas that have been disturbed by timber harvests.

California milk vetch (*Astragalus californicus*) was only recently discovered in Oregon (Brock 1999a) in the Scotch Creek RNA. Other populations occur further south into northern California. Undocumented occurrences in grasslands in the Monument are likely. Its habitat is in bluebunch wheatgrass / Idaho Fescue grasslands, on southerly aspects in rocky, shallow soiled sites. Some of California milk vetch sites in these grasslands are becoming dominated by yellow star-thistle, and an apparent competitive relationship between these two species has been documented (Brock and Callagan 1999b).

Bondarzew's polypore (*Bondarzewia montana [B. mesenterica]*) is a rare fungus that is generally found in later successional conifer communities, usually as a saprophyte with white fir (*Abies concolor*). This species is also a Survey and Manage species under the NWFP (USDA 1994a). The one documented population within the Monument is near the southern extent of this species range.

Greene's mariposa lily (*Calochortus greenei*) is a rare, beautiful, local endemic species found in open shrub / Oregon white oak woodlands along the California - Oregon Border and south into the Shasta Valley. The soils are usually deep and high in clay content. Brock (1996) found that its reproduction is limited by the browsing removal of the flowers and fruits which appear during mid summer and are quite palatable to both cattle, deer and rabbits. This species is at risk from horticultural collection and grazing pressure from deer, rabbits and livestock. Much of this species habitat in low and mid elevation has been altered by rural development, impacted by livestock grazing, and noxious weed invasion, all of which have reduced the species viability in these areas (Brock 1996). Cattle grazing, if properly managed, does not appear to be a threat in its self, however, uncontrolled, or poorly controlled grazing can severely impact the species (Brock 1988b; Brock 1996). There are populations near Hutton Creek / Pilot Rock, in the Oregon Gulch RNA, along Keene Ridge, and in the oak woodlands on Agate Flat.

Saw-toothed sedge (*Carex serratodens*) was recently discovered in the Monument (Brock and Callagan 1999b) in the Scotch Creek RNA in a *Acer macrophylum* dominated riparian area. This plant is known for moist meadows and rocky places near seeps and springs in the Rogue Valley, and down the Sierra Nevada and coast range in California. Clustered lady's-slipper (*Cypripedium fasciculatum*) is found in isolated, widely scattered and usually small populations in the west from the Rocky Mountains in Colorado to the Pacific coast. Mid to late-successional forests with canopy closures greater than 60 percent appear to be the optimum habitat for this species. This species has been managed both as a Bureau Special Status plant, and a Survey and Manage species under the Northwest Forest Plan. *Cypripedium fasciculatum* is a slow-growing, long-lived orchid with a obligate mycorrhizal association and an arguable dependence on fire. Two populations of *C. fasciculatum* have been located in the Monument. One vigorous population occurs in a mixed conifer-madrone stand on a steep slope above Emigrant Creek and the other population occurs in old growth Douglas-fir near the edge of a clearcut in the Lincoln Creek drainage. *Cypripedium fasciculatum* was also collected in 1923 at Johnson Prairie, but has not been relocated and may be extirpated.

Several occurrences of the Mountain lady slipper (*Cypripedium montanum*) are known from the Monument. Like *C. fasciculatum*, this species has been managed both as a Bureau Special Status Plant, and a Survey and Manage Species under the Northwest forest plan. This species is found in a variety of plant communities, with 60-80 percent canopy closure in mixed conifer and mixed evergreen /oak woodland communities.

Siskiyou fritillary (*Fritillaria glauca*) is found in numerous locations in the Rogue Valley in open, gravelly slopes and ridges, usually on serpentine soils. The two occurrences known for the Monument, however, occur on dry open, rocky ridge lines with mountain mahogany and are not on serpentine soils. This local endemic occurs in scattered locations in southwest Oregon and into northern California.

Beautiful stickseed (*Hackelia bella*) is a southwest Oregon and northern California endemic, found in forest openings, grasslands, and along streambanks. This Bureau Tracking species has been under- reported in the Monument (Tong 2000). It is known to occur in grassy meadows, and openings in white fir forests around Table and Chinquapin Mountain. It is not found in the southern portion of the Monument.

Greene's hawksweed (*Hieracium greenei*), another Northern California and SW Oregon endemic is found in single location in a dry, open Ponderosa Pine / Douglas-fir community along a small rock ridge. This small population (7 plants) is the only occurrence documented in the Monument.

Baker's globemallow (*Iliamna bakeri*) is known for the west Cascades and Modoc plateau in California, and the Klamath Mountains in southwest Oregon. Its habitat in its range is open areas in juniper woodlands, and lava beds. Four occurrences are documented in the Monument, two in clearcuts (white fir community types), one along road edge, and one in a rocky 'opening in a white fir (*Abies concolor*) community'. While it appears this species can be found in early successional, or disturbed habitats, the existing populations are very small. Additional sites are likely in the southern end of the Monument adjacent to the California border.

Dwarf isopyrum (*Isopyrum stipitatum*) is known from just north of San Franciso, through the northern Sierras and Coast range into Southern Oregon. It is found in shaded slopes, chaparral, and mixed evergreen /oak woodlands. There are several large occurrences (thousands of plants) of this species around the Agate flats area of the Monument in grassy meadows, and under shrubs in Oak /ceanothus woodlands. There is one occurrence near Round prairie in a ecotone between a mixed conifer and rocky grassland.

Tracy's peavine (*Lathryus lanszwertii* var. *tracyi*) is a northern California and southwest Oregon endemic plant known to occur in a few sites in and adjacent to the Scotch Creek RNA in small patches (less than 10 plants) in white oak /mountain mahogany chaparral. More sites are likely in unsurveyed portions of the Monument in these chaparral communities.

Bellinger's meadow-foam (*Limnanthes flocosa* var. *bellingeriana*) occupies a special habitat associated with high winter and spring water tables and impervious basalt subsoil layer. Soils are wet for three or more months of the year. Plants grow in or near the edges of vernal pools. This plant is a narrow endemic found on impervious basalt areas in the vicinity of Lincoln, in the Oregon Gulch RNA, and in tributaries of Jenny creek. The site near Lincoln is of botanical importance as the type locality for the species (the place where the designated nomenclatural type was collected).

Detling's microseris (*Microseris laciniata* ssp. *detlingi*) is a BLM sensitive species that is found only in Oregon. It is found in grassy openings in open, rocky shrublands with scattered Oregon white oaks. This plant is known in the Monument from Siskiyou Pass, Skookum creek, lower Keene ridge and near Agate Flat. Several large (thousands) of populations occur in the southern portion of the Monument.

Pale monardella (*Monardella glauca*) is known from one area in the Monument near Chinquapin Mountain in open mixed conifer forest (white fir - Douglas-fir) on rocky south slopes at 5200 feet. More occurrences are known in Josephine county, and south into northern California, and east into the great basin into Nevada.

Common nemacladus (*Nemacladus capillaris*) is a species found in the Sierra Nevada Mountains of California, and in the Monument. It is known from the four sites in xeric, rocky openings in mixed conifer forests (Juniper, white fir and Douglas-fir). Two of the sites have very few plants (less than 10) and the other two number in the hundreds.

Howell's false-caraway (*Perideridia howellii*)is a northern California and southwest Oregon endemic known from a number of locations in wet meadows, moist mountain slopes in oak woodlands and mixed conifers, and along riparian zones in the Monument.

Common pithya (*Pithya vulgaris*), despite its name, is a rare fungus known for the Pacific Northwest, and boreal forests in the temperate zone (British Columbia, Idaho). It is also documented in the Alps in Europe. It is most often found as a needle /branch endophyte on downed Abies branches in white fir communities in the Monument.

Coralseed allocarya (*Plagiobotyrys figuratus* ssp. *corallicarpus*) grows in open vernal creeks near Lincoln. The Lincoln population is unusual for its size (thousands), and isolated from other known populations in Sams Valley, north of Medford. Interference with surface hydrology would put the population at risk.

Miller's cup fungus (*Plectania milleri*) is a rare Pacific Northwest endemic fungus that is saprophytic on downed conifer branches. Sites in the Monument are associated with mixed conifer sites, often with Douglas-fir, Ponderosa pine, Incense cedar, and Oregon white oak, under moderately closed canopies (50%).

Klamath gooseberry (*Ribes inerme* var. *klamathese*) is known in southwest Oregon and adjacent northern California from streamsides and moist meadow edges. Four occurrences are documented for the Medford District of BLM. In the Monument, it is documented in the riparian zone in Scotch Creek RNA in small patches of up to 16 'clumps'. This species rarely fruits and heavy browsing by caterpillars was documented in surveys by Brock and Callagan (1998b). More populations are likely in other riparian areas in the southern portion of the Monument. Himalayan blackberry (an exotic species) has been documented out competing this rare species in the Rogue valley.

Parish's nightshade (*Solanum parishii*) is known from California and adjacent southern Oregon in dry chaparral and dry oak /pine woodlands. There are three sites within the Monument, each with fewer than ten plants. Two occur in old, open clearcuts in dry Douglas-fir /Oregon oak communities, and one in a dry wedgeleaf ceanothus-Klamath plum chaparral in the Scotch Creek RNA. Several other sites in southwest Oregon are in dry chaparral communities, and all are very small populations.

Survey & Manage Plant Species

This group includes the vascular plants, bryophytes, lichens, and fungi that were managed following the implementation of the Northwest Forest Plan. Occurrence data for bryophytes, lichens, and fungi has only been collected since 1997. General surveys have been conducted on the northern portion of the Monument, almost exclusively in conifer dominated communities. Only small areas in the dryer and less forested southern portion of the Monument have been examined for bryophytes, lichens, and fungi.

Seven fungi, two lichens and two vascular plant species (also Special Status Plant species) have been found in the Monument (Table 2-29). All organisms, except one lichen, are associated with mid-mature to late-successional conifer forests. One lichen, *Calicium viride*, is found commonly on hardwoods in moist (riparian) to xeric conditions. In Table 2-29, absence of The Nature Conservancy (TNC) rarity rating for most of the bryophytes, lichens, and fungi reflects a lack of information on species biology, distribution and ecological requirements.

Table 2-29. Survey and Manage Plants Found within the CSNM

Species	Taxa Group	TNC*
Bondarzewia mesenterica	fungus	-
Calicium viride	lichen	-
Cypripedium fasciculatum	vascular plant	G3G4/S2
Cypripedium montanum	vascular plant	G4G5/S4
Dendriscocaulon intricatulum	lichen	-
Gyromitra esculenta	fungus	-
Gyromitra montana	fungus	-
Tremiscus helvelloides (syn. Phlogiotis)	fungus	-
Pithya vulgaris	fungus	-
Plectania milleri	fungus	G3?/S2
Sarcosphaera coronia (syn. eximia)	fungus	-

*G = Global rank   S = State rank

1 = Critically imperiled because of extreme rarity or because it is somehow especially vulnerable to extinction or extirpation.

2 = Imperiled because of rarity or because other factors demonstrably make it very vulnerable to extinction (extirpation).

3 = Rare, uncommon or threatened but not immediately imperiled.

4 = Not rare and apparently secure but with cause for long-term concern.   5 = Demonstrably widespread, abundant, and secure.

Special Status Plant Surveys

Formal and informal rare plant surveys have been done within the Monument area on BLM lands since the mid 1980s. No surveys have occurred on private lands. Prior to 1999, about 8,261 acres had been surveyed, mostly in conifer communities for forest management projects (i.e. timber sales) in the northern zone (USDI 2000c). Some incidental surveys not associated with projects have also occurred around existing rare plant sites, but these for the most part are not well documented. In 1999, landscape level surveys on about 11,987 acres were surveyed for Bureau special status plants in the south-eastern portion of the Monument (Keene Ridge / Jenny Creek / Agate Flat area), which included the eastern portions of the Soda Mountain Grazing allotment north and east of the power line, and all of the Jenny Creek allotment. Plant community inventories, that also documented rare species occurrences, were also done in 1999 on 1,800 acres in the Scotch Creek RNA (Brock and Callagan 1999b).

Noxious Weeds and Introduced Plants

Introduced non-native plant species were brought to the Pacific Northwest, accidentally or purposefully, from other continents over the past 150 years. These species are often referred to as 'weeds'. Many weeds or introduced plants are relatively harmless or beneficial. Others, that are not already invasive or noxious, have a high potential to become so in all or part of their range. Plants that have been determined to be 'noxious' based on their negative environmental and/or ecological impacts have a special legal status that requires specific actions to eradicate them.

Noxious Weeds are designated by the Oregon State Weed Board. Noxious weeds are defined by the Weed Board as "[those plants] which are injurious to public health, agriculture, recreation, wildlife, or any public or private property." Noxious weeds have been declared a menace to public welfare (ORS 570.505) (ODA 2000). Not all weeds that can cause ecological harm are designated as "noxious".

Two statutory mandates guide the BLM in managing weeds on public lands. Section 302(b) of the Federal Land Policy and Management Act of 1976 directs the BLM to "take any action necessary to prevent unnecessary or undue degradation of the lands" (43 USC 1732(b)). Section 2(b)(2) of the public Rangelands Improvement Act of 1978 adds that the BLM will "manage, maintain, and improve the condition of the public rangelands so that they become as productive as feasible..." (43 USC 1901(b)(2)).

In general, introduced plants are likely to invade or become noxious since they lack co-evolved competitors and natural enemies to control their populations. Many of these species have the ability to out-compete native species for light, food, water and space. A few plants such as dandelion (*Taraxacum officinale*) and yarrow (*Achillea millefolium*) have both introduced and native populations in the North America, making identification difficult.

Introduced plants can potentially displace native species, alter native plant and animal habitats, and alter ecological processes in plant and animal communities. Noxious weeds can rapidly infest areas following fire events, reducing the natural levels of species diversity (Asher and Harmon, 1995). Weeds compete with native species for water, space, and nutrients, are often early and prolific seeders, and may produce fruits capable of long distance dispersal by various means, such as wind, water, or animal transport. Weed seed can be distributed by being caught-up in fur or hooves of native animals and livestock. The clothes and soles of recreationists can transport weeds along trails and at campsites. Seeds and root pieces in mud or vegetation that cling to motor vehicles and equipment (bumpers, wheel wells, tires) can be spread along roads to newly disturbed areas or even invade relatively undisturbed sites. Wind, generated by passing vehicles, helps spread weed seeds along roads.

Some introduced species present on public lands have essentially integrated into the natural flora, are not aggressive, don't dominate plant communities, and generally don't cause the problems we usually associate with noxious weeds. Species like certain speedwells, (*Vernonica* spp.) and chickweeds (*Stellaria media*) occur in numerous habitats, but in relatively low densities. Some introduced species can be desirable for reasons such as erosion control after disturbance while waiting for native species to gradually reestablish themselves. Non-persistent species like clover or short-lived grasses like slender wheatgrass (*Elymus trachycaulus*) or annual rye (*Lolium multiflorum*) are sometimes used in this manner. Unfortunately, persistent, aggressive exotics have also been used in erosion control mixes, such as crested wheatgrass (*Agropyron cristatum*) and tall fescue (*Festuca arundinacea*). Species like Himalayan blackberry (*Rubus discolor*), or yellow star-thistle (*Centaurea solstitialis*) can quickly dominate plant communities, and out-compete native species. These species have the ability to create significant pressure on the succession and evolution of plant communities. Many non-native species are poisonous to wildlife, livestock and humans.

Of special concern in grasslands, sage lands, and oak woodlands in the west has been the establishment of non-native annual grasses. Grasses like cheatgrass (*Bromus tectorum*) and medusa head (*Taeniatherum caput-medusae*) dominate large areas in open woodlands, shrublands, and savannahs throughout the western United States, and in the Monument. These annual grasses out compete native perennial species and have changed the ecology of vast areas in the western North America. The harmful effects of these introductions are just now being realized.

Generally, introduced species respond to disturbance events and can thrive under disturbed conditions. Large populations of exotic species are often present in open, disturbed areas at lower elevations; especially in dry meadows, oak and shrub communities, open pine savanna, and to a minor degree in wet meadows. Once disturbed, these communities are quickly invaded by non-native species from outside seed sources or the soil seed bank. Native grasses and forbs often have great difficulty competing with the weeds that germinate in the fall or winter, and are able to out-compete the natives species for moisture in soils that are shallow or have limited moisture holding capacity.

Non-native species in the Monument are currently uncommon in undisturbed, closed canopy, mixed conifer or white fir forests at higher elevations; except where canopy light gaps and soil disturbance are created by roadsides, recreation sites, or skid-trails from timber harvests. This is not the case through-out the west however. In Idaho, yellow hawkweed (*Hieracium pratense*) has been observed invading into relatively undisturbed grand-fir and mesic western red cedar habitats in Idaho, after being introduced and establishing along roadways and timber harvest landings (Anderson 1998). This same species is also found invading pristine sub-alpine grasslands above 7,000 feet in the Bitteroot mountains. There are weed species that once introduced and established, can expand into relatively undisturbed habitats. In southwest Oregon, *Torilis arvensis* can dominate understories in relatively undisturbed Douglas-fir forests and white oak woodlands (Tong 2000). Several thistle species (*Cirsium* spp.) and mullein (*Verbascum thapsus*) are common in disturbed areas at higher elevations. At higher elevations where low intensity fires were historically common, attempts to create open "park-like" areas in stands of conifers can result in the establishment of weedy thistles and annual grasses.

Sedge and rush dominated wet meadows tend to be more resistant to an invasion by non-native species. However, weedy species which are adapted to wet soils associated with ponds, ditches, or open riverine systems, such as portions of the Parsnip Lakes or Jenny Creek, may occasionally become established. An introduced grass, Reed canary grass (*Phalaris arundinacea*) has recently been documented in Jenny Creek (Salix Associates 2000). This species can form a solid mat that excludes all other species. Purple loose-strife (*Lythrum salicaria*) is becoming a problem in riparian areas, ponds, seeps, in the Rogue Valley, but has not yet been documented in the Monument.

About 10 percent (66 species) of the flora within the Monument is composed of introduced species, (see Appendix F) and occur in all plant communities. Introduced plants are found in open plant communities (woodlands, shrublands, savannahs) and disturbed areas in the greatest number and density. Non-natives frequently dominate these areas and some are considered noxious weeds. A high number of introduced grasses exist in the Jenny creek area, as a result of past grazing activities and pasture management. There are 12 listed noxious weed species introduced in the Monument of particular interest because of their intensity of impact on human welfare and the natural environment, and their potential to cause significant environmental damage (Table 2-30).

Road building, grazing, logging, recreation and other disturbance activities have resulted in a number of noxious weeds becoming established in the Monument. Future disturbance activities have the potential to introduce new weeds, and create conditions optimal for the expansion of existing populations.

The three most serious noxious weeds in the Monument are yellow starthistle (*Centaurea solstitialis*), Canada thistle (*Cirsium arvense*), and medusahead (*Taeniatherum caput-medusa*). Dyer's woad (*Isatis tinctoria*) also has the potential to become a serious ecological problem.

Yellow starthistle is associated with roads traversing the more open habitats. It has spread into relatively pristine areas from these establishment points. In the Scotch Creek Research Natural Area, yellow starthistle is common and becoming dominant in portions of the savannahs. Other areas where yellow starthistle is also established are along the entire length of the Schoheim road and in portions of the Jenny Creek drainage.

Canada thistle is common along the roads in the area around Hobart Peak and Mill Creek. Canada thistle is an aggressive noxious weed and if left unmanaged, has the potential to form dense infestations. This plant's ability to propagate both sexually and asexually gives it a competitive advantage over many of the plants occupying the same site.

Medusahead is the most common noxious weed in the Monument in terms of numbers and area covered. Many low to middle elevation grasslands are heavily infested. Grasslands on high clay content soils are particularly prone to invasion. Medusahead forms a heavy, high silica thatch that retards or prevents germination of native species, and may become a fire hazard.

Dyer's woad (*Isatis tinctoria*), while not widespread in the Monument is of special concern because of its ability to spread rapidly and invade undisturbed sites. In the Pacific Northwest, it is estimated that dyer's woad is spreading at an annual rate of 14 percent on BLM rangeland (USDI 1986).

Table 2-30 lists the most prevalent noxious weed species known to occur in the Cascade-Siskiyou National Monument. Other introduced weeds are documented in Appendix F. It is primarily based on the 1996-1998 Medford District noxious weed surveys, rare plant

Table 2-30. Common Introduced and Noxious Weeds in the CSNM

Scientific Name	Common Name	List*
Centaurea diffusa	diffuse knapweed	B
Centaurea maculosa	spotted knapweed	B, Target
Centaurea pratensis	meadow knapweed	B
Centaurea solstitialis	yellow star-thistle	B, target
Cirsium arvense	Canada thistle	B
Cirsium vulgare	bull thistle	B
Convolvulus arvensis	field bindweed	B
Cuscuta pentagona	dodder	B
Hypericum perforatum	klamathweed	B
Isatis tinctoria	dyer's woad	A
Linaria dalmatica	dalmatian toadflax	B
Taeniatherum caput-medusae	medusahead	B

*State of Oregon Noxious Weed List

"B" designated weeds are weeds of economic importance that are regionally abundant but may have limited distribution in some counties surveys performed in the 1990s, recent surveys of the Scotch Creek RNA (Brock and Callagan 1999a), and Carex (sedges) inventories done in 2000 (Salix Associates 2000).

Fire and Fuels

Wildfire History

Fire is recognized as a key natural disturbance process throughout Southwest Oregon (Atzet and Wheeler 1982). Human-caused and lightning fires have been a source of disturbance to the landscape for thousands of years. Native Americans influenced vegetation patterns for over a thousand years by igniting fires to enhance values that were important to their culture (Pullen 1995). Early Euro-American settlers to this area used fire to improve grazing and farming and to expose rock and soil for mining. Fire has played an important role in influencing successional processes. Observations based on fire scars and vegetative patterns indicate that large fires were a common occurrence in the area and were of varying severities.

Climate and topography combine to create the fire regime found throughout the CSNM. Fire regime refers to the frequency, severity and extent of fires occurring in an area (Agee 1991). Vegetation types are helpful in delineating different fire regimes. Three broad fire regimes within the CSNM were identified using vegetation types as a basis for fire regime delineation. These regimes are based on the effects from fire on the dominant vegetation. Refer to map 22 for the location of these fire regimes on the landscape.

Fire Regimes

Low-Severity Regime

This regime is characterized by vegetation types such as grasslands, shrublands, hardwoods and mixed hardwood, and pine which are similar to the Interior Valley Vegetative Zone of Franklin and Dyrness (1988). These plant communities recover rapidly from fire and are directly or indirectly dependent on fire for their continued persistence. The dominant trees within this regime are adapted to resist fire due to the thick bark they develop at a young age. A low-severity regime is characterized by nearly continual summer drought; fires are frequent (1-25 years), burn with low intensity, and are widespread. Approximately 64 percent of the CSNM falls into this category.

Moderate-Severity Regime

This regime is associated with the Mixed Conifer Vegetative Zone of Franklin and Dyrness (1988). Approximately 33 percent of the CSNM is categorized in this regime. This regime is characterized by long summer dry periods; fires are frequent (25-100 years). It is the most difficult to characterize and is often located in a transitional position between low and high elevation forests or plant communities. Fires burn with different degrees of intensity within this regime. Stand replacement fires as well as low intensity fires can occur depending on burning conditions. The overall effect of fire on the landscape in this regime is a mosaic burn.

High-Severity Regime

This regime is characterized by the White Fir Vegetation Zone (Franklin and Dyrness 1988). This environment is characterized by moist, cool conditions with infrequent fires. Accurate fire return intervals have not been calculated because of the long intervals between fires. When fires occur, they are due to unusual conditions, such as drought periods associated with high winds. Fires are of high intensity and normally are stand replacement fires. Approximately 3 percent of the CSNM is in this fire regime.

In the early 1900s, uncontrolled fires were considered to be detrimental to forests. Suppression of all fires became a major goal of land management agencies. From the 1950s to present, suppression of all fires became efficient because of an increase in suppression forces and improved techniques. As a result of the absence of fire, there has been a build-up of unnatural fuel loadings and a change to fire-prone vegetative conditions.

Based on calculations using fire return intervals, it is estimated that five fire cycles have been eliminated in the southwest Oregon mixed conifer forests that occur at low elevations (Thomas and Agee 1986). Species, such as ponderosa pine and oaks, have decreased. Many stands, which were once open, are now heavily stocked with conifers and small oaks which has changed the horizontal and vertical stand structure. Surface fuels and laddering effect of fuels have increased, which has increased the threat of crown fires that were once historically rare.

Many seedling and pole size forests of the 20th century have failed to grow into old-growth forests because of the lack of natural thinning once provided by frequent fire. Frequent low intensity fires serve as a thinning mechanism which naturally regulates the density of the forests by killing unsuited and small trees. Consequently, much old-growth forest habitat has been lost along with diminished populations of old-growth dependent and related species. In addition, ponderosa pine trees that thrive in fire prone environments are quickly shaded out by the more shade tolerant Douglas-fir or white fir species in the absence of fire. As a result, some late-successional forests have undergone a rapid transition from ponderosa pine stands to excessively dense true fir stands. Trees growing at lower densities, as in ponderosa pine stands, tend to be more fire-resistant and vigorous. Eventually they grow large and tall, enhancing the vertical and structural diversity of the forest. Some populations of organisms that thrive in the more structurally diverse forests that large trees provide are becoming threatened.

Many forests developed high tree densities and produced slow growing trees rather than faster growing trees after abrupt fire suppression became policy in about 1900. Trees facing such intense competition often become weakened and are highly susceptible to insect epidemics and tree pathogens. Younger trees (mostly conifers) contribute to stress and mortality of mature conifers and hardwoods. High density forests burn with increased intensity because of the unnaturally high fuel levels. High intensity fires can damage soils and often completely destroy riparian vegetation. Historically, low intensity fires often spared riparian areas, which reduced soil erosion and provided wildlife habitats following the event.

The absence of fire has had negative effects on grasslands, shrublands, and woodlands. Research in the last few decades has shown that many southern Oregon shrub and herbaceous plant species are either directly or indirectly fire-dependent.

Several shrub species are directly dependent on the heat from fires for germination. Without fire these stands of shrubs cannot be rejuvenated. Grass and forbs species may show increased seed production and/or germination associated with fire.

Indirectly fire-dependent herbaceous species are crowded out by larger-statured and longer-lived woody species. This is particularly so for grasses and forbs within stands of wedgeleaf ceanothus and whiteleaf manzanita with a high canopy closure. High shrub canopy closure prevents herbaceous species from completing their life-cycle and producing viable seed. Many grass species may drop out of high canopy shrub lands in the absence of fire because of their short-lived seed-bank.

Fire history recorded over the past 20 years in Southwest Oregon (outside the CSNM) indicate a trend of more large fires which burn at higher intensities in vegetation types associated with low-severity fire regimes and moderate-severity fire regimes. This trend is also seen throughout the western United States. Contributing factors are the increase of fuel loading due to the absence of fire, recent drought conditions, and past management practices.

Fire Risk

Risk is the probability of when a fire will occur within a given area. Historical records show that lightning and human caused fires are common in the CSNM. Activities within this area such as established campgrounds, dispersed camp sites, recreational use, and major travel corridors add to the risk component for the possibility of a fire occurring from human causes. The time frame most conducive for fires to occur in the CSNM is from July through September.

Information from the Oregon Department of Forestry database from 1967 to 1999 show a total of 232 fires occurred throughout the CSNM. Lightning accounted for 55 percent of the total fires started. Of these fires, 186 were less than 0.25 acres in size (Class A fire), and only 1 fire was larger than 100 acres in size. Fire data previous to 1967 is not available.

Fire history data was used to assess fire risk for the CSNM. This risk assessment utilized the total number of fire starts over a given period of time for the CSNM. The derived value corresponds to the likelihood of fire starts per 1,000 acres per decade. Results show that the Cascade-Siskiyou National Monument is in the low fire risk rating. See Appendix H for information regarding the fire risk rating calculation. Maps 23, 24, 25,and 26 illustrate specific information regarding past fires within the CSNM.

Fire Hazard

Fire hazard assesses vegetation by type, arrangement, volume, condition and location. These characteristics combine to determine the threat of fire ignition, the spread of a fire and the difficulty of fire control. Fire hazard is a useful tool in the planning process because it helps in prioritizing watersheds and areas within a watershed in need of fuels management treatment.

Hazard ratings were developed for the CSNM. Map 27 shows the location of the different fire hazard ratings within the area. Table 2-31 summarizes the percent acres in each fire hazard rating category. Reference Appendix I for a description of how fire hazard was determined.

Table 2-31. Fire Hazard Ratings for the CSNM

Fire Hazard Rating	Percentage of Acres in each Category
Low hazard	2%
Moderate hazard	66%
High hazard	32%

Fire Suppression

The Bureau of Land Management has a master cooperative fire protection agreement with the Oregon Department of Forestry (ODF). This agreement delegates the responsibility of fire protection of all lands within the CSNM to the Oregon Department of Forestry. This contract directs ODF to take immediate action to control and suppress all fires. Their primary objective is to minimize total acres burned while providing for fire fighter safety. The agreement requires ODF to control 94 percent of all fires before they exceed 10 acres in size. Areas within the CSNM which requires special suppression methods designed to minimize damage to unique habitat and resources have been designated. Required specific fire suppression tactics or limited tactics within the CSNM are listed in Appendix L.

It is acknowledged that fire will occur within the CSNM. Over the past thirty years a large percent of lightning caused fires in the CSNM have been accompanied by rain. Moist fuels and quick response times by Oregon Department of Forestry have been the main reason the fires have not been large in size and burned at high intensities.

Road access plays an important role in determining response time of initial attack forces to a fire. Analysis of fires in the CSNM over the past thirty years indicates only 9 percent were farther than 600 meters from existing roads. The average response time to these fires was 2-1/2 hours compared to an average response time of 1 hour to fires that were within 600 meters of existing roads.

Road access is limited in the area of the CSNM which is south of Soda Mountain, Pilot Rock, and Keene Ridge. Specific roads in this area which are critical for initial attack forces have been identified by the Oregon Department of Forestry. Refer to Table 2-32 for a list of these roads. Without these roads the probability increases, under certain weather parameters, that wildfires would become large and burn at higher intensities. Due to the majority of the CSNM being in a moderate to high fire hazard in this area, there is the concern that without these roads, it would be difficult to keep fires that start on BLM land within the CSNM from burning adjacent private lands.

Table 2-32. Key Roads needed for Wildfire Suppression Efforts south of Pilot Rock, Soda Mountain, and Keene Ridge

Road Name	Road Number/General Location
Power line Roads (Skookum Creek Road)	BLM 40-3E-27.2
Pilot Rock Jeep Road	BLM 40-3E-30.0
Tie Through Road to Emigrant Creek	Private road in T.40S.,R.2E., Section 36
Randcore Pass Road through Private Property to Agate Flat	BLM 40-4E-19.2
Randcore Pass to Rosebud Helipond	BLM 40-3E-19.1
Soda Mountain Road	BLM 39-3E-32.3
Mill Creek to Soda Mountain Road	BLM 40-3E-12.0
Access across Jenny Creek in multiple locations to private property	
Access from California	Copco Road

Fuels Management

Prescribed fire is a management tool that would assist in meeting the objectives of conserving, protecting and restoring values for which the Monument was established. In 1995, a new federal fire policy (USDA 1995) was issued directing federal land managers to expand the use of prescribed fire in order to reduce the risk of large wildfires due to unnatural high fuel loadings and to restore and maintain healthy ecosystems. All fuel management activities which would occur within the CSNM would meet Monument Aquatic Conservation Strategy.

When utilizing prescribed fire in Research Natural Areas (RNA), it should be based on the fire history of the area and past vegetation patterns known for the area. The application of prescribed fire should closely approximate the frequency, intensity, size, and the "natural" season of fire when possible. Management plans for the Oregon Gulch RNA and Scotch Creek RNA can be found in Appendix DD and EE.

The Fire Management Plan for the Soda Mountain Wilderness Study Area allows the use of prescribed fire within the WSA. It states "prescribed fire, resulting from planned ignitions, shall be permitted in the Soda Mountain WSA to maintain the natural condition of a fire dependent ecosystem." The intent of prescribed fire within the WSA is to reintroduce the natural process of fire. The Fire Management Plan for the Soda Mountain Wilderness study area can be found in Appendix G.

Prescribed fire is a tool that could be used to help eliminate and or reduce the spread of noxious weeds within the CSNM. Fuels management activities can also be utilized within the CSNM to meet the objectives of protecting and enhancing late-successional habitat for the Northern Spotted Owl. To protect or minimize damage of this habitat from wildfires, desirable fuel characteristics adjacent to and within this habitat needs to be maintained.

As previously discussed, fire is recognized as playing an important role in the development and maintenance of vegetative diversity in fire prone ecosystems as found throughout the CSNM. Prescribed fire is a tool which could be used to meet objectives for vegetative communities within the Diversity Emphasis Area of the CSNM. In the grasslands prescribed fire could be used for the improvement of native grass/annual grass mix to a more native grass domination and assist in the restoration of annual grass monoculture to a native grass domination. In the shrublands, prescribed fire would help recreate a range of wedgeleaf ceanothus stand ages across the landscape. The use of prescribed fire in the Woodlands would help restore tree composition due to the invasion of conifers. The balance of herbaceous plants, shrubs and trees could also be restored in the Woodlands. Fire would also assist in the thinning of White Oak stands to historic tree densities.

Air Quality

Prescribed burns are conducted within the limits of a Burn Plan which describes prescription parameters so that acceptable and desired effects are obtained. Smoke produced from prescribed burning is the major air pollutant of concern.

Fuels management activities generate particulate pollutants in the process of treating natural and activity related fuels. Smoke from prescribed fire has the potential to effect air quality within and surrounding the CSNM. The use of prescribed fire for ecosystem restoration can produce enough fine particulate matter to be a public health and/or welfare concern. Fine particulate matter in smoke can travel many miles downwind impacting air quality in local communities, causing a safety hazard on public roads, impairing visibility in class I areas, and/or causing a general nuisance to the public. If properly managed, most negative effects of prescribed fire smoke can be minimized or eliminated.

The National Ambient Air Quality Standards (NAAQS), set by the authority of the Clean Air Act (CAA), cover six "criteria" airborne pollutants: lead, sulfur dioxide, carbon monoxide, nitrogen oxides, ozone and particulate matter. The lead and sulfur content of forest fuels is negligible, so these two forms of air pollution are not a consideration in prescribed burning.

Prescribed burning does emit some carbon monoxide (CO), from 20 to 500 lb. per ton of fuel consumed. This would be a concern if there were other persistent large CO sources in the immediate vicinity. CO is such a reactive pollutant, however, that its impact is quickly dissipated by oxidation to carbon dioxide where emissions are moderate and irregular and there is no atmospheric confinement.

Burning also emits moderate amounts of volatile organic compounds (VOC) and minor amounts of nitrogen oxides (NOx). These are precursors to formation of ground level ozone. Here, fire-related emissions may be seen as important only when other persistent and much larger pollution sources already cause substantial non-attainment of NAAQS . Particulate matter smaller than 10 micrometers (PM 10) is a term used to describe airborne solid and liquid particles. Because of its small size, PM 10 readily lodges in the lungs, thus increasing levels of respiratory infections, cardiac disease, bronchitis, asthma, pneumonia, and emphysema.

The fate of PM emissions from prescribed burning is twofold. Most (usually more than 60%) of the emissions are 'lifted" by convection into the atmosphere where they are dissipated by horizontal and downward dispersion. The "unlifted" balance of the emissions (less than 40%) remain in intermittent contact with the ground. This impact is dissipated by dispersion, surface wind turbulence and particle deposition on vegetation and the ground. The risk of impact on the human environment differs between the two portions of smoke plume.

Smoke Aloft

Until recent decades, the impact of the lifted portion of smoke was ignored because it seemed to "just go away." These impacts are generally not realized until the mechanisms of dispersal bring the dispersed smoke back to ground level. Because the smoke has already dispersed over a broad area, the intensity of ground-level exposure is minimal. The duration of exposure may include the better part of a day, however, and the area of exposure may be large.

Ground Level Smoke

Unlike smoke aloft, the potential for ground level smoke to create a nuisance is immediate. This part of the smoke plume does not have enough heat to rise into the atmosphere. It stays in intermittent contact with the human environment and turbulent surface winds move it erratically. Also in comparison to smoke aloft, human exposure is more intense, relatively brief (a few hours) and limited to a smaller area. Smoke aloft is already dispersed before it returns to the human environment while ground level smoke must dissipate within that environment. Dissipation of ground level smoke is accomplished through dispersion and deposition of smoke particles on vegetation, soil and other objects.

Non-attainment Areas

The population centers of Grants Pass, Medford / Ashland (including Central Point and Eagle Point), and Klamath Falls have past history of being in violation of the national ambient air quality standards for PM 10 and are classified as non-attainment for this pollutant. The non-attainment status of these communities is not attributable to prescribed burning. Major sources of particulate matter within the Medford/Ashland non-attainment area is smoke from woodstoves and dust and industrial sources. The contribution to the non-attainment status of particulate matter from prescribed burning is less than 4 percent of the annual total for the Medford/Ashland air quality management area. Over the past seven years the Grants Pass and Medford/Ashland population centers have not been in violation of national ambient air quality standards for PM 10.

The pollutant most associated with the Medford District's resource management activities is PM 10 found in smoke produced by prescribed fire. Monitoring in southwest Oregon consists of nephelometers (instrument designed to measure changes in visibility) in Grants Pass, Provolt, Illinois Valley, Ruch and eventually in Shady Cove. One medium volume sampler is collocated with the nephelometer at the Provolt site. The medium volume sampler measures the amount of PM 10 and smaller at ground level.

National Ambient Air Quality Standards for PM2.5 have been established to protect human health. Due to the lack of monitoring data for PM2.5 these standards have yet to be implemented. It is estimated that by year 2003 that monitoring data for PM2.5 will be completed. When standards are implemented for PM 2.5 all burning proposed within the CSNM will comply with these standards.

Administration of Smoke Producing Projects

The operational guidance for the Oregon Smoke Management Program is managed by the Oregon State Forester. The policy of the State Forester is to:

1. Regulate prescribed burning operations on forest land.
2. Achieve strict compliance with the smoke management plan.
3. Minimize emissions from prescribed burning.

For the purpose of maintaining air quality, the State Forester and the Department of Environmental Quality shall approve a plan for the purpose of managing smoke in areas they designate. The authority for the State administration is ORS 477.513(3)(a).

ORS468A.005 through 468A.085 provides the authority to DEQ to establish air quality standards including emission standards for the entire State or an area of the State. Under this authority the State Forester coordinates the administration and operation of the plan. The Forester also issues additional restrictions on prescribed burning in situations where air quality of the entire State or part thereof is, or would likely become adversely affected by smoke.

In compliance with the Oregon Smoke Management Plan, prescribed burning activities on the Medford District require pre-burn registration of all prescribed burn locations with the Oregon State Forester. Registration includes specific location, size of burn, topographic and fuel characteristics. Advisories or restrictions are received from the Forester on a daily basis concerning smoke management and air quality conditions. These advisories or restrictions insure that burning done by the Medford BLM is in compliance with standards set for particulate matter.

Transportation System

Travel routes in the CSNM are used by cars, trucks, heavy equipment, motorcycles, bicycles, horses, pedestrians, and other modes of transportation. These routes are used for recreation, resource management, and private property access. The BLM provides a transportation system for many different recreation experiences and management opportunities (map 30 and Plate 1).

The BLM identifies approximately 470 miles of road on approximately 85,173 acres of land across all ownerships associated with the CSNM. Of this total, the BLM controls approximately 251 miles of road that accesses the 52,947 acres Monument. Roads in the CSNM vary from primitive four wheel drive roads to paved highways. BLM inventories contain very little information about non-BLM controlled roads. Most of the County and State roads have a bituminous surface and private roads are usually rocked or are left unsurfaced.

Existing Transportation Management Objectives (TMOs) have been developed for individual roads based on maintenance level definitions and access status (see Plate 1 and Appendix CC). Roads associated with the CSNM are controlled or owned by the BLM, timber companies, Jackson County, the State of Oregon, and many private landowners. Several county roads, State Highway 66, old State Highway 99, and Interstate 5 are major highways that provide access into and across the CSNM. Major access roads that the BLM uses to access the CSNM are Pilot Rock, East Hyatt Lake, Copco, Emigrant Creek, Baldy Creek, and Soda Mountain roads. Many shorter private and BLM roads provide access throughout the CSNM. In many areas the public has no legal right to use roads to access public lands (Appendix CC, and Plate 1). In several areas the BLM has obtained legal access for the management of public lands. In most areas the BLM and large land owners have reciprocal agreements that allow access for forest management of lands and removal of timber (map 34, Appendix CC). On several roads the BLM has obtained road easements which allow public access. Other types of easements obtained by the BLM do not provide public access on non-federally owned roads. At this time some landowners have not prevented the public from general use of their road (i.e., Copco road, and portions of Emigrant Creek, Baldy Creek, and Soda Mountain roads). However, this informal public use across private lands could cease at any time.

BLM controlled roads are generally open for vehicle use by the public unless blocked by gates or other road barriers. Some roads have been officially closed and have signs designating the closure. Officially closed roads may not have barriers (other than signs) but use of the roads are prohibited by law. Of the total of 251 miles of BLM controlled roads approximately 77 miles are blocked (map 30). Gates and road barriers regulate vehicle access to reduce maintenance costs, road damage, soil erosion, water quality degradation, transfer of noxious weeds, wildfire protection, and wildlife disturbance.

Road maintenance is conducted by the different owners and management agencies. Water, oil, or lignin are usually applied to road surfaces when hauling rock or timber during dry periods for dust abatement and to keep roads from disintegrating. Water is used when placing surface rock and for road maintenance, which allows for proper processing and reduced segregation of the road surface rock. There are developed water sources and rock quarries in the Monument where the BLM obtains water and rock for road work.

Most BLM controlled roads were constructed for log hauling and administrative purposes. The BLM charges fees for commercial use of roads and then uses these fees to help pay for road maintenance. Many roads previously maintained at a high level are not being maintained to that extent any longer due to reduced timber harvesting. To reduce maintenance requirements and erosion potential, some unnecessary roads have been, or could be, decommissioned. However, roads with rights-of-way grants provide primary access to private lands may not be permanently closed or decommissioned. Other roads are closed until future access is needed and many others are maintained at the lowest possible levels with an emphasis on proper drainage.

BLM roads have a maintenance level assigned to them (map Plate 1 and Appendix CC). Roads are monitored and the maintenance levels are modified when needs and conditions change. Maintenance levels range from minimal standards on short roads to high standards on main roads. Roads are like any other facility or structure, they need to be maintained to function as designed. Roads that have been maintained and are in good condition are shown on map 35. Sharing and maintaining roads with landowners has reduced total miles of BLM road necessary for access and also reduced maintenance costs. The goal is to protect Monument resources while maintaining the transportation system in a safe condition. The result is a transportation system that provides limited access for law enforcement, various recreational activities, private property access, resource management, wildfire suppression, and other administrative uses.

Road maintenance includes removing safety hazards, reducing soil erosion potential and providing for fish passage at all potential fish-bearing stream crossings. Safety hazards include hazard trees that have the potential to fall on houses, recreation areas, or roadways. Hazard trees are usually dead, but may be alive with roots undercut or with significant physical damage to the trunk or root system. Proper maintenance of road drainage systems and stream crossing culverts is essential to avoid both erosion and fish passage problems. Most of the existing culverts were designed to withstand 50-year flood events. New drainage structures will be designed to withstand a 100-year flood event and if appropriate, provide for fish passage. Road protection measures include constructing drainage structures, grass seeding, blocking roads, placing road surface rock, and applying bituminous surfacing.

Three road surface types are found on BLM-administered roads: bituminous (asphalt), rocked, and natural (no surface protection). Main access roads usually have a bituminous surface, but may have a crushed rock surface. Roads off main access roads usually have a crushed rock surface, and dead end spurs generally have a natural surface (map 36). Most rocked roads in the CSNM are located in the northern portion. The southern portion has more natural surfaced roads which include jeep roads. Adequately surfaced roads generally allow for year-round travel and reduce soil erosion, which helps to minimize stream sedimentation. Several unsurfaced roads are closed to minimize resource damage and control erosion. There are developed quarries in the CSNM where rock may be obtained for surfacing roads, drainage protection, and maintenance for administrative purposes.

All motorized and non-motorized mechanized travel is currently prohibited on BLM roads 41-2E-10.1 and roads leading to it (Plate 1) as a result of the creation of the CSNM. Persons who are exempt from the prohibition are:

- Any federal, state, or local officers engaged in fire, emergency and law enforcement activities;
- BLM employees in official duties;
- Persons authorized to travel on designated routes by the Monument manager.

This restriction will remain in effect until completion of this Resource Management Plan. The planning process may result in a decision to maintain or modify this prohibition.

Livestock Grazing

The history of livestock grazing in the area of the Cascade-Siskiyou National Monument dates back to the 1850s. Large herds of horses and cattle grazed the area from the Klamath River to the Dead Indian Plateau. With the expansion of farming and ranching in the 1850s, ranchers began to move livestock from the Rogue Valley to the lands east of the Cascades. During the mid-1860s ranchers began to exploit the rich meadows of the high elevation meadows. Prior to 1870, Rogue Valley ranchers were unable to supply all of the meat needed to meet the demands of gold miners. Sheep operators ran large bands of sheep in the area. Sheep were pastured with cattle in the high mountain meadows of the Cascades. Severe overgrazing was reported in some areas of the upper Rogue Valley. Woolen mills established in Ashland were successful until the drop in wool prices during the 1930s. Raising livestock was very profitable in both the Rogue Valley and Klamath Basin in these early years.(Follansbee 1978).

During this period of unregulated use, rangeland resources and ecological conditions are reported to have suffered significant harm from overgrazing. Control of these ranges did not occur until passage of the Taylor Grazing Act in 1934. Prior to 1934, public rangelands of the west were administered by the General Land Office. This office was to provide for survey and disposition of public domain lands from federal ownership to state and private ownership. The Taylor Grazing Act was the vehicle for recognizing these public domain lands as a national asset and withdrawing them from future filing or transfer. The long term goals of this law were the improvement of range conditions and the stabilization of the western livestock industry. The Taylor Grazing act gave a preference for grazing permits to settlers, residents, and other stock owners who owned adjacent or nearby lands or water rights. Grazing allotments established on BLM lands were based upon historical areas of grazing use at the time of passage of this important land management tool.

In 1946, the Bureau of Land Management was established. During the early 1960s, range surveys were completed to determine the capacity of the land for grazing. Following these surveys, decisions on forage were adjudicated and livestock numbers set on most areas in the west. In April of 1975, a Federal court agreement required the BLM to prepare Grazing Environmental Statements on public grazing lands. To comply with this agreement, the *Medford District Grazing Management Program Environmental Impact Statement* was completed in 1984. Additional planning documents have been completed since that time in the form of the *Final Supplemental EIS on Management of Habitat for Late-Successional and Old growth Forest Related Species Within the Range of the Northern Spotted Owl*(USDA 1994a)*; the Medford District Resource Management Plan EIS* (1995a)*; and the Jenny Creek Watershed Assessment and Analysis* (USDI 1995b). The Oregon/Washington Office of the BLM has adopted Standards and Guidelines for Rangeland Health that are to be applied to rangeland management decisions (USDI 1997).

Early grazing was largely uncoordinated and conflicts occurred between California livestock operations moving cattle onto summer ranges and the operators who lived in Oregon. In 1974, a Coordinated Resource Management Plan was written which attempted to reduce conflicts between California and Oregon operators and to improve rangeland conditions on the Soda Mountain Allotment. A separate Allotment Management Plan was developed to improve rangeland conditions and riparian habitat within the Jenny Creek Allotment in 1997. The Allotment Management Plan includes terms and conditions to achieve specific resource condition objectives.

The cattle numbers on the Soda Mountain and Keene Creek allotments have been reduced dramatically since the 1970s. Cattle numbers are presently 34 percent and 39 percent, respectively, of the numbers grazed in the 1970s. Reductions on the Soda Mountain allotment have taken place for a variety of reasons. Timber companies have reduced cattle leases due to environmental concerns, conflicts, and low revenues which failed to cover administrative costs. In some cases, leases were lost due to retirements, failures to comply with regulations and conflicts with rural interface areas. In 1994, the Keene Creek allotment was reduced through a voluntary agreement with the livestock operator. Reorganization of the ranch and rebuilding of herd numbers, increasing conflicts with recreationists at Howard and Hyatt Lakes, summer homes, recognition of increasing numbers of deer and elk, and the presence of candidate fish species such as the Jenny Creek sucker and Red-band trout contributed to this agreement.

Livestock grazing is a "grand-fathered" use that occurs within the Soda Mountain Wilderness Study Area. Rangeland management activities in the Soda Mountain WSA are administered under guidelines contained in the *Interim Management Policy for Lands Under Wilderness Review* (H-8550-1). This policy outlines minimum data requirements and maximum acceptable impacts for rangeland developments and livestock grazing.

There are seven separate grazing allotments within the CSNM. Table 2-33 displays the allotments, present operators and livestock use within the Monument. Refer to map 37 for location of allotments and rangeland improvements across the CSNM. Currently, eight operators have active authorized use within the area. The authorized active use on public lands for the 2000 grazing year was 3,754 AUMs (an AUM or animal unit month, is the amount of forage required to sustain a cow and calf for one month).

Table 2-33. BLM Grazing Allotments within the Cascade-Siskiyou National Monument

Allotment Name	Acres*	Lessee	Livestock Numbers	Use Dates	AUMs Authorized
Ashland Resource Area (Medford District)					
Agate	97	Vacant	----------	-----------	9
Box R Ranch	80	Don Rowlett	1	6/15-11/15	5
Jenny Creek	1,303	Taylor Ranch	30	5/16-9/10	116
Keene Creek	10,240	Joe Dauenhauer	350	6/16-10/15	1,404
Keene Creek		Jim Miller	59	6/16-9/30	208
Siskiyou	1,930	Vacant	-----------	------------	200
Soda Mountain	35,471	John Mosby	181	5/1-10/15	1,000
Soda Mountain		Bob Miller	47	5/16-10/15	238
			58	6/16-10/15	232
Soda Mountain		Jennifer Walt	80	6/16-10/15	321
Klamath Resource Area (Lakeview District)					
Dixie	100	Jerry Barry	75	5/15-9/15	8**
Buck Mountain	520	Vacant	56	-------------	13**

*indicates approximate public land acres in the CSNM **AUMs proportioned to reflect the amount of the allotment within the CSNM

Management objectives for individual allotments are dynamic and change over time as new information is discovered. This helps to determine the level of intensity with which allotments are managed in terms of planning, monitoring, and investments in rangeland improvement projects. In order to describe the level of management required, each allotment has been placed in one of three categories. This process is referred to as Allotment Categorization and is comprised of :

- Improve (I) – the allotment will be managed intensively for improvements
- Maintain (M) – current management will be sufficient to maintain conditions
- Custodial (C) – a minimum amount of labor will be expended to maintain existing resources

The categorization of allotments into these categories is not dependent solely on a rangeland condition rating, but also reflects such factors as potential conflicts between resource uses and potential productivity on the allotment. All of the allotments within the CSNM are categorized as Improve allotments based upon resources with the exception of the Agate allotment which is a Custodial allotment.

Wild Horses

The Pokegama Herd Management Area was established in the 1970s with the passage of the Wild Horse and Burro Act and the first management plan for the area was written in 1978. The herd is believed to have been established in the early 1900s by a rancher who originally turned out a quarter horse stud and seven mares. Herd census indicates a relatively stable population with only gradual increases in horse numbers. The BLM Klamath Falls Field Office has primary responsibility for management of this wild horse herd and has established an Appropriate Management Level of between 30 and 50 horses for the area (USDI 1995c).

Approximately 20 acres of the 80,900 acre Pokegama Herd Management Area are within the CSNM. This area lies along Copco road and East of the former Box-O Ranch. Due to the insignificant area of overlap, the impacts to the Pokegama Herd Management Area will not be analyzed in this proposed Plan.

Recreation

The major recreation activities occurring on BLM administered lands in the Monument include camping, hiking, horseback riding, mountain biking, driving for pleasure, sightseeing, hunting, fishing, driving off highway vehicles, snow play, cross country skiing, snowmobiling, rock climbing, nature study, and vegetative gathering (mushrooms, Christmas trees, firewood). The Hyatt Lake Recreation Complex is the only developed recreation site within the Monument.

What is now the Hyatt Lake Recreation Complex was part of the Hyatt-Howard Special Recreation Management Area (SRMA) before the Monument was created. This SRMA was designated in the Medford District RMP in 1995 and consisted of the lands that comprised the viewshed around Hyatt Lake and Howard Prairie Reservoirs. These lands were given a visual resource management classification of II to protect the visual quality of the area for recreational users. A portion of this SRMA was included in the Monument (Plate 1) and is now referred to as the Hyatt Lake Recreation Complex (HLRC).

The Hyatt Lake Recreation Complex consists of the main Hyatt Lake Campground, Wildcat Campground and a Watchable Wildlife site. The Hyatt Lake campground consists of 57 campsites, hot showers, a group camping facility, group day use facility, a playground, a ballfield, two boat launches, fishing docks and a fish cleaning station. Wildcat Campground has 12 campsites, two vault toilets, and a gravel boat ramp. There is no potable water at Wildcat Campground. A Watchable Wildlife site with wildlife interpretive panels, a picnic table and a vault toilet is located on the west side of Hyatt Lake in the northwest corner of the Monument. Outside of the HLRC, the majority of use is unstructured or dispersed recreation with most use occurring on roads, streams, Pilot Rock, or the Pacific Crest National Scenic Trail (PCNST).

There are two nationally designated areas within the Monument, the PCNST and the Soda Mountain Wilderness Study Area (WSA). The PCNST consists of the main trail and two spur trails leading to scenic overlooks. These spur trails are at Hobart Bluff and Wildcat Hills. The PCNST receives moderate use from local residents for day hikes and approximately 50-100 people pass through the area on the trail as through hikers (traveling from Mexico to Canada).

The Soda Mountain Wilderness Study Area (WSA) consists of the headwaters of the Dutch Oven Creek, Camp Creek and Salt Creek Subwatersheds. The boundary of the WSA is the same as originally identified, however, technical advances in mapping have recalculated the area within the original boundary. The WSA was previously thought to be 5,867 acres but geographical information system calculations show the area within the boundary as 6,447 acres. The Soda Mountain WSA was recommended for wilderness designation by the Secretary of the Interior in 1991. The President, in turn, recommended it for wilderness designation to the Congress in 1991. To date no Congressional action has been taken on these recommendations, therefore, the area is managed under the BLM's *Interim Management Policy for Lands Under Wilderness Review*, H-8550-1(USDI 1995d) which outlines what must be done to insure that the Area's suitability for wilderness designation is not impaired by proposed activities.

Currently there are about 60 miles of existing roads open to snowmobile use within the Monument. The BLM snowmobile road system is a part of the Southern Oregon High Lakes Trail System, which goes from Chemult, Oregon to Hyatt Lake. The snowmobile use in and around the Monument has always been very light due to the lack of gasoline for sale at Hyatt Lake. With the closest gasoline available at Lake of the Woods, most use occurs there. Present use within the Monument comes almost exclusively from local area residents.

Before the area was proclaimed a monument, snowmobiles were limited to existing roads until the snow depth reached 12 inches at which point the area was considered open and not limited to existing roads. With the establishment of the Monument, all snowmobile use is limited to existing roads which are open for public use regardless of snow depth. No cross-country travel by snowmobiles is allowed on BLM lands within the Monument.

Driving for pleasure is the number one recreational activity in the United States and OHV use was popular in the area now recognized as the Monument. As a result of the Presidential Proclamation, all off-road use by motorized and mechanized vehicles is prohibited within the Monument so vehicle use is now restricted to designated roads and trails.

The Pilot Rock area is another popular recreation destination where people can access the PCNST, climb rocks, collecting fossils and observe wildflowers.

Since the majority of the Monument is undeveloped, there are no accurate use figures, but use is estimated as light to moderate throughout the Monument. The Hyatt Lake Recreation Complex receives moderate use throughout the months of April through October. In 2000, records show that approximately 7,455 people visited the Hyatt lake Recreational Complex.

Minerals

The CSNM has low potential for locatable minerals, moderate potential for oil and gas, and low potential for geothermal resources, depending on the location within the area now designated as the Cascade-Siskiyou National Monument (USDI 1995a). The

Presidential Proclamation withdrew the Monument from all forms of entry, location, selection, sale, or leasing or other disposition under public laws, including but not limited to withdrawal from location, entry, and patent under the mining laws.

A mineral resources study of the Soda Mountain Wilderness Study Area conducted by the U.S. Geological Survey concluded much of the northern portion of the WSA has a moderate potential for gold and silver (Pickthorn 1990). Based on this study, there is speculation that the area north of the WSA to the top of Soda Mountain has low to moderate potential for gold and silver but development of the area is prohibited by the Presidential Proclamation. This study also indicated a low potential for oil and gas and geothermal resources. In the past, there were mining claims located in the Agate Flat area. These claims were primarily for agates and were held by a local gem and mineral club. These claims have since been abandoned and no claims were on record at the time of the Presidential Proclamation of the Monument.

Authorized Uses

Background

Over time, the BLM has formally recognized and authorized a variety of uses within the boundary of the National Monument. The magnitude of the uses within the Monument includes an airstrip, a public school facility, a lookout, a group religious gathering, two communication facilities, as well as other uses. The oldest of these varied uses is the fire lookout located atop Soda Mountain. This lookout was established in 1933 by the Oregon Department of Forestry (ODF) and is still in active status. ODF regards Soda Mountain as the most important lookout in their jurisdictional area due to its strategic position serving a two state\three county area.

Existing Authorizations

Existing Authorizations (Valid Existing Rights) within the Cascade-Siskiyou National Monument fall broadly into two main types: linear and site authorizations. Water rights are addressed in the Hydrology section. Examples of linear authorizations are roads, utility lines, and water developments such as ditches or canals. Site authorizations are mainly associated with the communication site which has gradually developed on Soda Mountain since the days of the first fire lookout more than sixty years ago (see photos Appendix O). Other site authorizations include the microwave communication facility located on "Chestnut Mountain" just southwest of Chinquapin Mountain, the Pinehurst School complex, and the State Highway Department Maintenance site. Appendix P provides basic information on the current authorized uses (Valid Existing Rights) which exist in the National Monument on public lands. Lands that are under reciprocal rights-of-way agreements are displayed on map 34 and information concerning these lands is in Appendix CC.

These authorizations serve a wide range of commercial and non-commercial uses and interests. Some authorizations are held by private citizens for legal access to their personal property within the overall Monument area. Some are held by large corporations such as PacifiCorp, U.S. West, U. S. Cellular, and COBI, which serve major markets in Oregon and California. Other authorizations are held by non-profit entities or governmental agencies which serve diverse interests along the I-5 corridor, the Green Springs Highway (State Hwy 66) and the greater three county area (Jackson, Klamath and Siskiyou) located in southern Oregon and northern California. The authorizations range in size from a fraction of an acre to major utility lines which span long distances and cross both public and private lands. The commercial interests associated with the various authorizations represent significant outlays of capital investment and benefit a wide range of end users who utilize water, electricity and communication services. All commercial site users pay an annual rental which is based on a national "schedule" for determining communication site values. These are important services to agriculture, commerce and the public sector in this region.

Rights to Sub-lease

Several communication site authorizations include the right for the Holder to sub-lease to other compatible users. Under this arrangement, additional users operate equipment for their own particular needs. This group includes a private towing company, a Jackson County consortium of users, a Federal Agency, and additional commercial operations. All commercial users are assessed an annual site rental fee per the national schedule and are billed each calendar year for use of the site.

Other Rights

Holders of existing authorizations have a valid existing right to "operate, maintain, and terminate" their use, system, or facility. In many cases, this right includes use of service roads which provide physical access to the use, system, or facility. In the case of the major electrical transmission lines, this right of access includes the use of minimum standard road(s) for periodic inspection and maintenance. PacifiCorp has an ongoing maintenance program whereby their facilities are monitored and maintained either on a scheduled basis or on an as needed basis when emergency conditions dictate. (See "Transportation Section" for further discussion of these roads).

Approximately seven acres of the Monument are currently leased to Pinehurst School located in the town of Lincoln. Pinehurst School is a community school serving K-8th grades, and has held a Recreation and Public Purposes (R&PP) lease for school use since 1964. The lease was renewed in 1984 and currently includes the school building, the ball fields, and several other structures. The lease will be up for renewal in 2009. The BLM plans to continue renewing this lease as long as the original purposes for leasing the lands remain the same.

Visual Resources

The BLM Medford District Resource Management Plan (RMP) currently allocates the area within the Cascade-Siskiyou National Monument into Class II, III, and IV. Class II is allocated for the Hyatt/Howard Prairie Lake Special Recreation Management Area and a 1/4 mile corridor on either side of the Pacific Crest National Scenic Trail and the Hyatt Lake Recreation Area. Class IV is allocated to the southeastern quarter within the Monument. The remaining area is allocated as Class III. Although not reflected in the Medford District's RMP, the land comprising the Soda Mountain Wilderness Study Area is to be managed as Class I, according to BLM Washington D.C. Office Memorandum (No. 2000-096). This memorandum states that the visual resources within Wilderness Study Areas (WSA) are to be managed the same as federally designated Wilderness (Class I) until released from WSA designation.

Public Outreach/Education

Interest in visiting and learning about the area increased in both the local and regional community with the proclamation of the Cascade-Siskiyou National Monument. The Medford District BLM, the Ashland Visitor's Center, the Hyatt Lake Recreation Area, and local businesses received many requests for information on the new Monument. In addition to generating interest in the area, the Monument designation caused concern among some local residents over potential use restrictions in this area. Residents with property adjacent to Monument lands also notified BLM of increased trespassing on their lands. In response to increased interest in the area, and concerns raised within the local community, the BLM has taken several interim steps to communicate and educate the public about the Monument.

Interim goals for the creation and dissemination of public outreach and education materials were as follows:

- Provide the public with an updated map of the area identifying roads that are open and suitable for public access. Many roads in the Monument pass through public and private land, and in most cases the BLM does not have rights for the public to access privately owned roads.
- Emphasize visitor awareness of and respect for the significant amount of private property interspersed with CSNM lands.
- Direct visitors seeking recreational opportunities to the Hyatt Lake Recreation Area and the Pacific Crest National Scenic Trail, both of which are already established as recreation sites. Avoid establishing any new visitation trends prior to the development of a management plan.
- Develop interpretive materials that identify and explain the resource values that the Monument is meant to protect.
- Clarify the immediate implications of the proclamation, as well as the direction of interim management. Publicize any interim management that changes existing use of the area.
- Explain the need to develop a management plan for the area, and how interested individuals and groups can become involved in the planning process.

With these goals in mind, the BLM sent a letter and additional information to over 1,500 people on the CSNM mailing list, created a temporary four page informational handout, updated the Monument website, and developed a full color interim brochure for distribution at the BLM Medford District Office, the Ashland Visitor's Center, Hyatt Lake Recreation Area, and at local businesses. In addition, a two page newspaper advertisement was published in the Ashland, Grants Pass, Klamath Falls and Medford newspapers providing a map and information about the newly created Cascade-Siskiyou National Monument.

The BLM is currently working on collaborative public outreach/education projects within the local community. Shortly after the Proclamation, the BLM worked with students in Southern Oregon University's Environmental Education Program to develop sample interpretive brochures and signs for the Monument. The BLM also has a cooperative agreement with Friends of the Greensprings to develop an informational kiosk at an existing site on the Greensprings summit. In addition, the Greensprings Inn distributes maps and brochures for visitors to the Monument area.

Social and Economics

Introduction: Defining the Affected Area

The social and economic assessment and effects analysis was done through contact with community residents, discussions with organization and group representatives with responsibility or interest in the CSNM area, and analysis of existing information. Kevin Preister and Luis Ibanez, of Social Ecology Associates, talked with over 41 community residents, store owners, ranchers, and recreationists, and about 46 representatives of environmental organizations, timberland owners, industry support groups, and representatives of federal land management agencies. Citizens most directly affected by

CSNM decisions are:

- Residents that live in the immediate vicinity;
- Individuals that make a living from public land resources, specifically grazing, forest resources, and recreation;
- Recreation users;
- Soda Mountain Wilderness Council, Friends of the Greensprings (FOG) and other organized interests;
- The Jackson County Board of Commissioners

From a social and economic standpoint, the Greensprings, Pinehurst and I-5 summit areas represent the primary zones influenced by CSNM. The secondary zone of influence is Jackson County. This section will present a rationale for this approach based on human geography and summarize major social and economic conditions for each area. Appendix M contains much of the statistical and demographic data used to support conclusions contained in this section.

Map 38 shows the boundaries of Social and Human Resource Areas in southwest Oregon and northwest California The red line shows the boundary for the Jefferson Social Resource Unit (SRU), an area with a common history, lifestyles and values. The "State of Jefferson" has long been known as an area of similarity, embodied in an effort to secede from Oregon and California that was cut short by the attack on Pearl Harbor in 1941. The story won a Pulitzer Prize in 1942 for the San Francisco Chronicle (Olson 1987). Today, there are over twenty businesses in the region sporting the name Jefferson, including the public radio station at Southern Oregon University.

Human Resource Units (HRUs) are subdivisions (shown within blue line on map 38) that reflect the boundaries within which people conduct most work, recreation, and lifestyle routines, including shopping, school affiliation, and family and social ties. These boundaries are derived from seven cultural descriptors and by self-reporting of residents. The methodology is described in Kent and Preister (1999). The seven descriptors are:

1) Publics: Segments of the population or group of people having common characteristics, interests, or some recognized demographic feature.

2) Networks: A structured arrangement of individuals who support each other in predictable ways because of their commitment to a common purpose, their shared activities, or similar attitudes.

3) Settlement Patterns: Distribution of a population in a geographic area, including historical cycles of settlement and changing land uses.

4) Work Routines: The ways in which people earn a living, including where and how. The types of employment, the skills needed, the wage levels, and the natural resources required in the process.

5) Supporting Services: Any arrangement people use for taking care of each other, including the institutions serving a community and the caretaking activities of individuals.

6) Recreational Activities: The way in which people use their leisure time.

7) Geographic Boundaries: Any unique physical feature that defines the extent of a population's routine activities.

The CSNM is located in the southeast part of the Jefferson Social Resource Unit in the Rogue Valley Human Resource Unit in Oregon. It does not extend east to Klamath County or south to Siskiyou County, California. By and large the California border in this area serves as the human border as well even though there are a small number of grazing interests that cross the California/Oregon border and there are modest shopping and social ties between Yreka and Ashland. Residents in the primary influence zone of Greensprings, Pinehurst and the I-5 summit relate primarily to the Rogue Valley Human Resource Unit.

The Greensprings/Pinehurst Community

History

The Greensprings area is a 4,000-foot high plateau near where the Southern Cascades join the Siskiyou Mountains. The Greensprings extends from Keene Creek Ridge in the southwest to Parker Mountain summit in the east. Several Native American tribes used the area, among them the Klamath and the Rogue, who tended to spend most of each year in the valleys. They also liked to camp in the natural prairies at higher elevations to hunt, gather seasonal resources, to meet and trade with other groups and escape the summer heat.

In 1846, Jesse and Lindsay Applegate opened a trail that crossed the Greensprings (Plate 1). By the mid-1860s, people were moving in both east and west on the Applegate Trail. National events then influenced Southern Oregon and the Greensprings. The 1906 Forest Homestead Act was abused by local residents and timber companies. The settlement of many lands, including the Greensprings, was done in part by people paid by both large and small lumber companies to live on the property and make improvements until they obtained legal title to the lands. Settlers would turn over their titles to these companies. This was followed by a congressional grant of alternate sections of public land to the Oregon and California Railroad that was misused by the railroads.

Several mills were established on the Greensprings for the purpose of cutting the huge stands of old-growth sugar pine and fir. The first significant population growth came with completion of the new highway in the 1920s. Most of the residents at this time worked for mills. There was an economic downturn in the 1960s when many local mills closed their doors because they were unable to compete with the big lumber companies.

The 1970s brought a change in the Greensprings population. Unable to find suitable work, many residents moved away, changed jobs or retired. Land is said to have gone from $32 per acre in the early 1960s to $500 an acre, a price that for many out-of-state folks was a bargain. The few that moved to the Greensprings in the 1970s went there to escape the big city life and to "get back to the land."

The present Greensprings community still shares the values and traditions of those who first moved there. Residents call the Greensprings, "a strong and committed community." A major theme of community life seems to be interdependence through self-sufficiency. The caretaking aspect of this community is evident in their stories, from the old settlers to the newcomers. The value of knowing your neighbors and the commitment to respond to a call of need continue to live in these parts

The community is also very committed to education. As in the past, the Pinehurst School serves as the social hub for young and old. Currently there is interest in expanding the school district boundary to include those residents west of Tubb Springs. The average price of land is now around $2,000 per acre.

Current Conditions

Map 39 shows four general socioeconomic areas for the CSNM. The Local residents, subdivide the Greensprings community into Areas B, C, and D. Area A, the I-5 summit, is included because of its proximity to CSNM lands, while the Old Highway 99 area north of the Siskiyou Summit is excluded from the primary zone of influence because there is no direct access to BLM lands from this area.

The 211 units in the primary zone (Table 2-34), is based on data provided by Jackson County Information Services. If the density of 2.94 per household from the census of this area is used, about 620 people reside in this area. The Greensprings community, as defined above, is thus estimated to contain 588 people. This estimate may be high because the Greensprings Directory, developed by Friends of the Greensprings (FOG), estimates the 1996 population at 400. Between the beginning of Buckhorn Creek Road west to the Klamath County line, there are 165 mailboxes. With the same density ratio, that would mean 485 people reside on the Greensprings assuming every household has a mail box. If the difference is split, a reasonable estimate of the Greensprings population is 537. Of this estimated number, 47 are students (at Pinehurst School, Ashland public schools, and a private school).

Although some local officials have criticized the census for undercounting in Jackson County, the 1990 census provides further clues about the population. The data of Census Tract 25, Block Group 1 are shown in Table AM-1 in Appendix M. It encompasses a wide area the east of Interstate 5 from the Oregon border, through the Greensprings area and Dead Indian Memorial Road country, the eastern Talent and Phoenix areas, ending at White City and Lake Creek. The 1990 census of this area was 1,205.

Table 2-34. Developed Properties in CSNM Area

Location	1901-1950	1951-1974	1975- 1989	1990- 1999	Total
Area A I-5 Summit	2	4	3	2	11
Area B Emigrant Creek/ Greensprings Summit	12	19	39	26	96
Area C Hyatt/ Howard Prairie	3	31	21	13	68
Area D Pinehurst/Copco	11	8	10	7	36
Total					211

Source: Jackson County Information Services

- Area A is the I-5 summit, Township 40S, Range 2E, Sections 31-36; Township 41S, Range 2E, Sections 1-12.
- Area B is the Emigrant Creek drainage, including Tyler Creek and Highway 66 past the Greensprings summit to Lincoln, Township 40S, Range 2E, Sections 1-2; 11-14; 23-26; Township 41S, Range 3E, Sections 1-12; Township 40S, Range 3E, all sections.
- Area C is the Hyatt Lake/Howard Prairie area generally north of Highway 66, Township 39S, Range 3E, all sections; Township 39S, Range 4E.
- Area D is the Copco/Pinehurst area, Township 40S, Range 4E, all sections; Township 41S, Range 4E, all sections.

On the basis of the 1990 census, and acknowledging that only about 45 percent (537/ 1205) of the people described in the Block Grant are estimated to be residents of the

Greensprings community, the following social and economic conditions pertain. The Greensprings community:

- Has more children and fewer seniors than Jackson County or the State of Oregon
- Is significantly more educated
- Has significantly greater incomes and dramatically less poverty
- Relies more on wage income, self-employment, and farm income, and less on social security
- Has a much greater proportion of owner-occupied units
- Has a much higher proportion of residents who pay more than 35% of their income for monthly homeowner costs
- Pays significantly less for rent
- Has about the same commuting time as others

Two points are worth developing. First, the numbers indicate what residents say—that they have a vibrant community with little poverty and high degrees of self-sufficiency. Second, there is some evidence of a rich/poor split. The Housing and Urban Development agency (HUD) considers a family under "cost burden" if 30 percent or more of monthly income is spent on housing. As illustrated in table AM-1 in Appendix M, 21 percent of homeowners spend 35 percent or more on housing indicates family budgets from stressed to simply inadequate.

Table AM-2 in Appendix M shows the results of an intercensal estimate of poverty rates for school age youth, conducted by the Census Bureau in 1996. It estimated that 16.7 percent of Pinehurst students were living in poverty. This finding is not consistent with the 1990 census or with estimates of school district officials. Of the 29 students currently enrolled in the Pinehurst school, only one family had a financial hardship during the winter of 1999 and is now doing very well.

Table AM-1 (Appendix M) illustrates that ethnicity of the community is mostly white with about two percent being of Hispanic origin and other ethnic groups comprising less that one percent of the total population.

The Rogue Valley Council of Governments (RVCOG) engaged in extensive community contact in the Greensprings area while implementing Oregon's "Rural Unincorporated Communities" program in 1997. This effort documented pertinent social and economic conditions as well as community goals. The study reported most of the soils of the area as "severe" in relation to absorption capability of septic systems. Higher construction costs, special designs, increased maintenance, and perhaps larger drain fields to accommodate poor soils were predicted. Whether this condition would limit future development was not stated.

The RVCOG report makes clear that Greensprings residents want to maintain their rural way of life, and that they want modest development opportunities to be consistent with rural lifestyles. A preference for low densities and for small-scale and home-based businesses was expressed. The long-range goal of the community was for sustainable development which they defined as "the allowance for small amounts of growth in commercial and residential uses that sustain the needs of the community for housing and local economy while maintaining preservation of the community's rural pattern of dispersed developments in a forested environment" (RVCOG 1997: p.35).

Social Institutions

A number of social institutions in the Greensprings links people within the community and with the "flatlanders" in the valley. The Pinehurst School with its active board and parent group is probably most important social institution. The school is the location for numerous community events. In addition, there are two churches, the Cascade

Christian Fellowship and the Lincoln Christian Church. The Oregon Extension of Houghton College contributes to the economy and to local life by bringing college students to the Greensprings each year. In addition, Health Emergency Access Response Team (HEART) was formed in 1990 to address emergency medical assistance needs.

The Friends of the Greensprings (FOG) was formed in 1986 and has served as a community forum for a variety of issues since that time. It serves to educate members about community issues and to advocate on their behalf. It has engaged in a wide range of activities from flower planting to mediating issues related to open range cattle and timber sales. It currently has about 350 members, half of whom do not live on the Greensprings.

Finally, the Soda Mountain Wilderness Council has been active for many years in promoting a wilderness designation for the Soda Mountain area. Although its interest in full preservation of the area does not have universal agreement in the community, it has gone to tremendous lengths to develop local and regional support.

The Greensprings Economy

The census revealed occupational differences between Greensprings residents and Jackson County and State of Oregon. As reported in Table AM-3 (Appendix M), this area:

- Has slightly less employment in agriculture and forestry than Jackson County and the State of Oregon;
- Has higher rates of employment, nearly double in most cases, in construction, personal services, recreation services, and educational services;
- Experiences a lower proportion of its workforce engaged in durable goods manufacturing, transportation, wholesale trade, finance / real estate, and public administration, which is not surprising in a rural area;
- Like the rest of southern Oregon, relies greatly on retail trade, indicating a strong commuting lifestyle to the nearby urban centers;

Newcomers tend to be affluent. Many who lived economically on the edge during the early part of the nineties have moved away. The elderly are the only ones who are financially on the edge, according to local residents.

What was noted, in conversations with local residents, is an economy composed of:

- Commuting to employment in the Rogue Valley, which seems to dominate the local economy; those for whom commuting is not possible talk of being "locked into" a low cash condition;
- Unearned income through retired citizens;
- "Modem cowboys" making a living from the global economy in a variety of ways (a creativity consultant with international clientele, an accountant from southern California);
- An informal economy, called by "The Handyman Economy;" by which residents actively exchange services, some for cash and some for trade, by which they survive;
- A handful of former loggers / tree planters who offer their services to the community for forest management, road building or excavation; Logging history is still part of the culture and active interest was expressed in fostering higher levels of forestry work in the future;
- Numerous home occupations (RVCOG 1997);
- Fewer ties to the land. Whereas a generation ago, primary incomes were earned from the land in some way, today that is no longer the case.

Predesignation Community Interests

Many people of the Greensprings are interested in the forest stewardship and management, especially in the interface. The RVCOG study reported a broad sentiment among residents that they are the real stewards of the forest resources in the area. As a corollary, they believe that corporate and government management has "pursued land management policies that do not protect or enhance the resource values of the area as effectively as the local community which is vested in the livability, responsibility to and character of the area" (RVCOG 1997: p.34).

Many of these folks, as well as many of the owners whose land borders public lands, stated their concern about removing fuels and thinning to keep a forest healthy. In their opinion the BLM could do more to maintain a healthier forest at the "interface." "We worry about a fire coming onto our property," was a common statement. The summer ranger for the Oregon Department of Forestry lives in the community and is well-regarded. He has in his house a map with locations of high risk for fire. His job has been to work with residents around fire concerns and to increase awareness of and readiness for fire events.

Many residents are very concerned with the current logging of private lands going on in the Greensprings. Many have reported seeing the same levels of logging on private lands that they witnessed on public lands in the early 1970s. One resident said the difference is that "now they are logging lands that are very dry--where it takes hundreds of years to grow trees that in other areas would take only a few years. The long term effects that will have in the corridor between the Cascades and the Siskiyous will be devastating."

Data for the Greensprings are not available through Oregon Department of Forestry except estimates of intent to cut a certain volume, nor through the timber tax receipts of the State Department of Revenue. Table 2-35 contains Jackson County information that substantiates a significant trend in timber harvest toward reliance on private lands.

The cost of settlement in the Greensprings has made it impossible for average people to live there. Currently, the county has many permit fees that run in the thousands of dollars, from permitting septic tanks to buildings. Also there is a time limit attached to these permits in which work must be completed, making it difficult for those with limited resources to complete work without re-permitting. Many residents have said that it is more feasible to buy already-developed property than to start from scratch.

Concerns about open range cattle on the Greensprings have been going on for many years. FOG has taken the lead in providing a voice to these issues, conducting a survey in 1990 that documented the widespread nature of the concerns and the costs to homeowners of open range cattle. Livestock districts have been formed as one method to deal with the problem and efforts with the Oregon State Police related to traffic risk have intensified in the last year. Residents say that allotments do not have good fences. Many residents have had to repair their fences and have experienced other costs. The expected BLM investment in rangeland improvements has not materialized. "There are a couple of bad apples out there that give everyone else in the business a bad name," one person said. Others are clear about wanting to preserve the cattle culture on the Greensprings. "Cattle is not what it used to be," an oldtimer said. Other residents pointed out how cattle "keep the fuels down."

Newcomer integration remains an ongoing interest and challenge on the Greensprings. It takes about a year for newcomers in the Greensprings to feel a part of the community. During the year, it is helpful if they participate in the school functions and other social events, like the oldtimers' picnic, a yearly event where the community gathers to cut, split and stack wood for the school. Many new residents are also new to rural life and many of them do not have snow removal equipment or fire fighting capabilities such as a water truck. Longer-term residents point to the cycle of people coming in and out of the community because they do not realize what living on the Greensprings will require.

"It is especially hard on the men," one woman observed, "because they don't socialize as much as women."

Post-Designation Community Interests

Post-designation group and individual interviews were conducted in early December 2000 for the BLM by social scientists from The University of Idaho (UI), College of Natural Resources. Residents and landowners adjacent to the Monument responded to open-ended questions posed by neutral facilitators regarding social and economic effects of CSNM designation on local communities. The purpose of these interviews was to identify the range of perspectives in the community related to two main questions:

- What have been the effects of CSNM on you and your community?
- How do you think CSNM will affect you and your community over the next 1 to 5 years?

The post-designation interviews revealed that there is a wide spectrum of perspectives within the community regarding the current and future effects of CSNM. For specific details on the post-designation interviews, and a complete listing of the themes that emerged from the interview data refer to Appendix FF.

One general theme that emerged from the interviews is that many community members currently have strong sense of uncertainty as to how the final form of the CSNM management plan will protect the Monument, and whether or how the management plan may affect private property and public land management. Many members of the community assume that the intent of proclamation that created CSNM will be carried out, but since the management plan has not yet been completed and released to the public, they are uncertain how.

A second general theme focused on how the designation of CSNM has polarized the community. While the polarization has in some cases led to less communication between people with opposing views on CSNM, it also appears to have facilitated greater communication between groups of people with shared views.

Potential changes to the character of the community and the local economy was another general theme. There is a wide range of opinion within the community regarding how CSNM may affect demographics, visitors, land ownership, development, extended families, and other aspects the community. Similarly, the community members perceive numerous ways in which CSNM may or may not affect the area's economy.

Access roads was another general theme. The network of forest roads in CSNM is used for recreation access, and in some cases, to access private property. Some community members felt that recent management activities related to road access in the Monument had been for the good. Others were concerned that new visitors to the Monument were causing deteriorating road surface conditions, or using roads to trespass private property. Others were concerned about gating roads and restricting access to public and private land.

Private property rights was another general theme. Some community members felt that CSNM management activities could result in potential spillover effects that may alter property values and the freedom to use property, may increase the need for landowners to actively discourage trespass, and may threaten other private resources such as timber, water, and structures.

Another general theme focused on BLM's ability to effectively manage CSNM. Some people were concerned that sufficient funds and personnel would not be available to BLM to conduct desired monitoring, restoration, protection, and administrative activities necessary to manage the Monument properly. Others were concerned that BLM has already implemented management changes before the Monument's management plan is completed and made public.

Summary of the Greensprings/Pinehurst Community

This is a strong, committed community. Residents expressed high value and action around education, land stewardship and production, self-sufficiency, and taking care of each other. Newcomers are wealthier, have an active interest in land stewardship, but are not thought to know much about taking care of the land. There is increasingly less livelihood tied to the land.

A Social and Economic Profile of Jackson County

Jackson County is considered the secondary zone of influence for purposes of social and economic analysis. That is because people in the Greensprings are oriented in their routines to Jackson County—work routines, family and social ties, schools, and so on. In addition, the economic costs and benefits of public land management accrue to Jackson County—timber receipts, agricultural spending, and recreation demand. The Jackson County Board of County Commissioner's representative for natural resource issues has stated the interest of Jackson County in maintaining management options for public lands in the CSNM area, regardless of the level of timber and grazing production that ecological analysis indicates.

Appendix M contains a statistical overview of the County. RVCOG has projected expected population in Jackson County to grow by 1.7 to 2.8 percent between 2000 and 2020.

The Economic Structure of Jackson County

Table AM-4 (Appendix M) confirms what everyone now knows. The economy of Jackson County has been profoundly changing over the last thirty years. The traditional sectors of agriculture, forestry, and wood manufacturing has been slowly but steadily declining, while the trades and services sectors, associated with recreation, tourism and retirement has been steadily increasing. From 1970 to 1998, wood manufacturing employment has gone from 12.3 percent to 4.8 percent, a loss of 7.5 percent of workforce share. During the same time period, services have come to claim 22 percent of the workforce, an increase of 9.9 percent, while trade (retail) activities comprise 23.2 percent of the workforce, an increase of 5.5 percent.

Non-farm employment in the state increased by nearly 40 percent from 1986 to 1996. Construction, trade and services has seen the most growth, with four elements of services particularly noteworthy: 1) business services (including temporary help, supply firms, computer software, service companies; 2) engineering and management firms; 3) social services; and 4) health care. Most of the government growth has occurred at the local level, while federal jobs have declined, especially with natural resource management agencies (Anderson 1998: 22).

All net employment growth in Jackson and Josephine Counties in the last decade has been in non-manufacturing. Of these nearly 22,000 jobs, three-fourths of them have been in wholesale and retail trade and services. Spurred by population growth, such employment increased from 19,000 in 1987 to almost 25,000 in 1997, associated with new outlets opening in the area—Target, Costco, Wal-Mart, Fred Meyer, and Montgomery Ward, to name just a few (Anderson 1998: 25).

Oregon Economic Development (OED) projects 19,000 net new jobs in the Rogue Valley by the year 2006. Nearly 50 percent are projected to occur in professional and technical occupations and service jobs (teachers, education workers [+1,340], health care specialists and technicians [+1,050], social workers and social service technicians [+600]). Service workers include food and beverage preparation and service occupations (+2,200), and personal service workers (+540), the largest group of which will be social service aides and childcare workers (because of day care and assisted living demands). Almost 20 percent of new jobs are expected to be in production, construction and related occupations, with smaller job growth in clerical and sales workers. Agriculture, forestry and related jobs will experience the least job growth—timber cutters, loggers and other kinds of forestry employment will decline by another 20 percent, while the rest of agriculture and forestry occupations are expected to increase by 330 net new jobs (19%). Gardeners, groundskeepers, farm workers, and forest conservation workers (forestry aides and tree planters) are expected to gain the most new jobs (Anderson 1998: 32-33).

The Oregon Employment Department conducted a study of people who moved to southern Oregon in 1997. The major reasons they gave for doing so were: 1) to be with family and friends; 2) quality of life; and, 3) retirement. In contrast, for the state of Oregon as a whole, the third reason was to look for a job (Anderson 2000: 4).

The composition of personal income has also shifted in southern Oregon. The Oregon Employment Department's latest regional economic profile shows a continuation of a trend toward less personal income through wages and more personal income "dividends, interest, and rent" and through a higher rate of transfer payments. Net earnings for the two-county region dropped from 72 percent of personal income to 55 percent between 1967 and 1997. Correspondingly, dividends, interest and rent climbed to 23 percent of personal income, while transfer payments rose to 22 percent. Transfer payments are Social Security and other retirement payments, Medicare, and veterans' benefits. The growth in transfer payments indicates the strength of the retirement presence in southern Oregon. The decline in the proportion of earnings reflects the loss of higher paying jobs in heavy industry (Anderson 2000).

A Summary of Key Economic Sectors Potentially Affected by CSNM

The relevance of this summary for CSNM decisions is that southern Oregon in the future will be increasingly comprised of individuals with disposable income, higher education, and environmental values who will create recreation demand on public lands.

Timber

Four areas of activity fall under this category: traditional timber harvest, small diameter timber, restoration forestry and special forest products.

Timber will continue to be an important economic activity but will not be a significant source of new jobs or higher incomes. Value-added and secondary wood products manufacturing can be an important component of the economy but is unlikely to replace the timber industry in jobs and income produced (ECONorthwest 1999).

The causes of decline in forest-based employment in southern Oregon have been much debated over the last few years. Many people have felt that environmental activism has been the cause, and they point to the spotted owl injunction of 1989 as evidence of a dramatic decline in the availability of federal timber supply. Indeed, the amount of harvested board feet in the Siskiyou and Rogue National Forests, as well as the Medford District of the Bureau of Land Management (BLM) has never returned to the levels of the 1980s. However, other observers have pointed to another cause of employment decline in the lumber and wood sectors—industry restructuring. For example, by 1986 timber production had returned to prior rates from the recession of the early 1980s, but timber employment in that year for Josephine County was only 81 percent recovered. By 1993, Josephine County had only 54 percent of the timber employment that it did in 1978 (Reid and Flagg 1995: 29). In short, a variety of supply and demand factors is likely to limit the lumber and woods products sector in the future.

In practice, this means that timber sales emerging from federal agencies will be at reduced level than in years past, will include greater quantities of small diameter material, and will continue to be purchased by the remaining mills in the region.

Statistics confirm what Greensprings residents and others have said—private lands are accounting for more and more of annual timber harvest. Table 2-35 below shows a general downward trend in the amount of timber harvested in Jackson County over the last several years. It also shows a trend toward greater reliance on private land cutting.

Table 2-35. Timber Harvest in Jackson County For Selected Years in Thousands of Board Feet (Scribner Log Scale)

	1993	1994	1995	1996	1997	1998
Forest Industry	57,015	49,069	92,960	43,985	80,646	90,475
Other Private	36,958	25,943	29,132	13,501	13,234	8,997
State	35	12	0	0	5	0
BLM	38,644	5,960	18,275	28,037	20,701	21,028
USFS	37,495	32,346	22,041	19,798	26,720	10,680
Other Public	228	69	58	52	183	4
Totals	170,375	113,399	162,466	105,373	141,489	131,184
Total Private	93,973	75,012	122,092	57,486	93,880	99,472
% Private/Public	55/45	66/44	75/25	55/45	66/34	76/24

Source: Oregon Department of Forestry, Annual Oregon Timber Harvest Report, Salem, Oregon.

Because of wildfire suppression and timber harvesting policies of the last few decades, southern Oregon forests have become dominated by highly dense stands of small diameter trees. To increase production levels and to promote forest health generally, land management agencies have been very interested in harvesting small diameter material. A number of pilot projects are underway in small diameter contracting and harvesting in the region. This management attention is giving rise to an increasingly visible secondary woods products industry.

Secondary wood processing creates specialty products with less volume of smaller diameter wood. These include millwork, dimension lumber, wood containers, prefabricated housing and miscellaneous products (SIC 243). Products created in Jackson County include pole furniture, fencing, wooden gift boxes, carved art forms, lamps, tables, and other products.

In Jackson County for the production of secondary wood products (SIC 243, excluding plywood/veneer, 244-249), total payroll increased from $25,325,384 to $43,858,438 between 1985 and 1993, an increase of 74 percent. The number of workers during this time period increased from 1,389 to 1,825, an increase of 31 percent. The average payroll for this sector in 1993 was $24,032, the same as a high technology job. The average yearly salary for lumber and wood manufacturing in 1993 was $28,210 (Reid and Flagg 1995: Appendix D). Hence, secondary wood products manufacturing is holding its own in Jackson County and is expanding in importance.

A "restoration forestry" is emerging in southern Oregon. Fueled by federal efforts to retrain timber workers, and by state and federal efforts to restore salmon runs, the local area has received resources designed to do riparian repair, tree planting, thinning, weed pulling, and erosion control activities on both private and public lands. A number of individuals and at least one firm, Small Woodland Services, make their livelihood from contracting for restoration services from individuals and natural resource agencies.

Finally, special forest products have received much attention in recent years because of the high incomes their harvest can generate, as well as the social conflicts generated with large numbers of people, some of different ethnic backgrounds, engaged in harvesting. Cedar boughs, ferns, mushrooms, medicinal plants and firewood are among the many non-timber species harvested in the woods. Local merchants reported increased spending by workers during harvest periods. Mushrooms are a significant source of holiday income for a large number of local families. Organizing efforts have been undertaken to educate the workers about environmentally safe harvest methods, identification and marketing. Local discussion about creating a storage facility, or of organizing harvesters into a guild-like structure, have failed to materialize, and special forest products gathering continues to be an individual and family activity.

Agriculture

ECONorthwest reported that both the number of farms and the acreage in farms have declined in the region, while farm jobs have increased slightly due to value-added activities. Citing census data for agriculture, they noted that agriculture is claiming a lower percentage of overall employment over time (Niemi and others 1999: 15).

Between 1992 and 1997, Oregon farms increased in number and decreased in size. The number of farms now is 34,030, and the average farm size is 513 acres. Oregon farming is tremendously diverse, third in the nation after California and Florida in the range of its production. Farms in Western Oregon tend to be much smaller than the average and more intensive in use. The Agricultural Census also changed the definition of a farm which may have caused the number to increase as well. Christmas tree, pleasure horse, and hybrid/poplar operations are now considered to constitute a "farm."

Small farmers in Oregon overwhelmingly have other jobs and most operations do not make much money. About 62 percent of farms earn less than $10,000 yearly. Almost all farming in Oregon is family owned (Oregon State University Extension Service press release, May 5, 1999).

On the Greensprings, cattle grazing is the primary agricultural activity. Indeed, cattle and sheep grazing was the means of settlement of this area, providing livelihood for some families for many decades, but leading to overgrazing in some areas. The Taylor Grazing Act of 1934 and subsequent efforts have improved range conditions to a degree, although concerns about the effects of grazing remain high for both residents and environmentalists. The number of cattle permitted on public lands in the CSNM area has declined significantly during the last several years. The Livestock Grazing section of this report summarizes these changes, current rangeland conditions, and the present number of people dependent on grazing allotments.

In both the region and the nation, the cattle industry has fallen on hard times during the last several years. Table AM-5 shows that total cattle numbers in Jackson County have stayed relatively constant but the value of the industry has risen substantially.

contributing nearly $8 million to the economy in 1996. In 1998, cattle and calves contributed $8.4 million to the Jackson County economy (Economic Information Office, Oregon State University, January 26, 1999).

Cattlemen could be affected by decisions made in the CSNM because they have private business interest dependant on public lands. Poor market conditions over several years, lack of investment in public land allotments, declining animal unit months (AUMs) on public lands, and the lack of young people in the business point to a stressed industry.

Oregon State University does "enterprise budgets" for typical agricultural operations in the state. Certain assumptions are made about herd size, pregnancy rate, and mortality, as well as about expenses and incomes given current market conditions. While they have conducted no enterprise budgets for Jackson County cow/calf operations, their enterprise budgets for other areas of Oregon show a dismal financial picture. For a 50 cow/calf operation in the high desert area of Oregon in 1997, they projected an overall loss of $12,958 and a per cow loss of $259, despite a gross revenue of $18,162. For a 210 cow/calf operation on irrigated pasture in the Klamath Basin, they projected a net loss to the operation of $34,269 in 1996, and a per cow loss of $163, despite a gross revenue of $72,370 (EM 8653 and EM 8477, respectively, Oregon State University Extension Service, http://osu.orst.edu/Dept/EconInfo/ent_budget/). The latter example assumes an AUM cost of $7, while a BLM AUM on the Greensprings costs $1.34. Although this year has witnessed a rise in prices after a six year low, no one expects dramatic changes in the near term.

Recreation and Tourism

Dean Runyan and Associates, in calculating the economic effects of tourism for the Oregon Tourism Commission, determined that Jackson County ranked 9th in the state for travel expenditures, although the county is 6th in population. They found that Jackson County travel spending grew 3.6% annually between 1991 and 1997, and 4.3% from 1996 to 1997. Travel expenditures were valued at $204.7 million in 1997 in Jackson County.

A 1995 study of outdoor recreation in Oregon showed that motorized recreationists (off-highway plus pleasure driving) spend on average $23.89/day, compared to $10.04 for non-motorized, dispersed users (Johnson and Rasker 1995). The Motorcycle Industry Council reported that sale of units was 453,000 in 1990 and 488,000 in 1993. Of this figure, off-highway motorcycles and all terrain vehicles (ATVs) accounted for 59 percent of sales, reaching $1.5 billion. In Oregon, motorcycles numbered 98,000 in 1997, of which 52,700 were on highway, 13,000 were dual sport (on and off highway), and 32,500 off highway. This means that 3.1 percent of the population in Oregon are motorcycle users (From a presentation by Terry Eccles, Oregon State Parks, to Johns Peak Recreation Committee, City of Jacksonville, Oregon).

The International Snowmobile Manufacturers Association reported 181,000 sales in 1994 and 258,000 in 1998, an increase of 43 percent (Press release, 7/22/98; www: snowmobile.org). The Oregon State Snowmobiler Association conducted a survey in 1994 of their 3000 members. They received 310 surveys back that showed spending patterns as follows:

Snowmobiles, $3,239,000 (per capita, $10,448); Trailers, $500,000 (per capita, $1,613); Tow vehicles, $3,000,000 (per capita, $9,677); Motels, $62,000 (per capita, $200); Food, $92,000 (per capita, $297); Clothes, $60,400 (per capita, $195).

Recreationists, shopkeepers and agency people interviewed for this report stated a common perception that most outdoor recreation on public lands in Jackson County represents local use. It is possible that more out-of-area visitors could be attracted to outdoor recreation opportunities in Jackson County. Data from Jackson County parks showed that Californian use of the Howard Prairie campgrounds has ranged from 5 to 14 percent over the years but is generally increasing.

The California State Department of Parks and Recreation commissioned a study in 1993 of the economic impacts of Off-Highway Vehicle use in the state. It found a family-oriented sport that generated $3 billion for the economy, with significant contributions to rural areas. The average spending per household, not including vehicle purchases, averaged $3,516 per year.

BLM for years has assumed a 2 percent rate of growth in recreation demand in the CSNM area. Although no documentation of use rates has been undertaken, the figure seems appropriate. A number of outdoor enthusiasts have pointed out that this area does not have the spectacular scenic beauty of other areas, but a number of other features do make it an attraction:

- It is known as a local area. Conversations with outdoor stores and with hikers reveal that the area is known as a local area. In the same way that the trades and services economy is fueled by a combination of a growing local population and by visitors, demand for recreation opportunities in the CSNM areas will grow as well.

- It is accessible for day uses from the tourism market of Ashland. With a half-million visitors coming to Ashland to see the Shakespeare Festival alone, a good number of people take the time to explore local surroundings. Outdoor stores in Ashland stated that they often direct day hikers and sight-seers to the Pilot Rock and Greensprings areas.

- Its biological diversity is an attraction for students, academicians, and forest lovers from other regions. In the Illinois Valley, biological and geo-physical resources have begun to be a tourist draw in their own right (Preister 1999), and some local residents believe a similar attraction could occur in the CSNM area, especially with national designation.

- The Pacific Crest National Scenic Trail, and related opportunities to create regional links for equestrian, snowmobile and other uses, encourage recreational uses of the area.

A number of individuals and businesses depend directly or indirectly on the natural amenities provided by BLM lands in the CSNM. Callahan's Restaurant and Lodge, Buckhorn Springs Resort, the Greensprings Inn and Lodge, Pinehurst Inn, Houghton College, and a fairly large artist community use the CSNM lands for their livelihood. The Box-R Ranch is creating a destination resort. The resorts at Hyatt and Howard Prairie Lakes, and Campers Cove, depend directly or indirectly on natural resource amenities.

Other Sectors

Appendix N summarizes two other sectors, medical services and the "modem cowboys"(global entrepreneurs), who are becoming a significant economic engine in rural areas of the U.S. West.

A Summary of Social and Economic Trends

Like other parts of the region, a trades and services economy has become dominant over the traditional sectors of timber, mining, and agriculture. These sectors tend to pay less than traditional sectors and help create families dependent on multiple income streams. Although a trades and services economy, especially one associated with tourism and recreation, pays low wages, this tendency is mitigated by the presence of retirement services, and particularly of medical services in Jackson County. Some social problems, such as latch key children and the need for youth outlets, can be created by a trades and services economy. A trades and services economy favors high levels of education and quality of life amenities, especially natural environment amenities.

Wage income as a percentage of total income generated in the valley has been declining. Conversely, transfer income associated with pensions, social security, and retirement benefits, as a percentage of total income in the valley, has been increasing as a function of the increased presence of older people in the population.

The number of people drawing economic livelihood from the global economy through computer modems, package delivery services and airports is high. These so-called "modem cowboys" or "lone eagles" are making serious, although unmeasured, contributions to the economy. These people live where they wish and rank quality of life considerations as highly important in choosing a place to live.

In the Greensprings area, there is now a more diverse mix of occupations than in prior generations. Some forestry workers remain, but commuters, professional people, self-employed cottage industry owners and retirees now have a presence as well.

Conclusions

The Greensprings community has an avid interest in participating with BLM in developing management strategies for public lands near them. Community members have an interest in creating or sustaining livelihoods for their families derived from public land management. Their history is steeped in forest work and they believe that their stewardship ethic can create ecological soundness while re-creating a labor force capable of restoration forestry.

The profound social and economic shifts that have been experienced in southern Oregon during the last thirty years will affect the management of public lands. The emerging population is more numerous, older, more educated, and has more leisure time and disposable income. Preservation interests are likely to intensify because they are demographically generated by the settlement of ex-urbanites into the small towns of southern Oregon.

Recreation demand is likely going to increase across a wide variety of recreation opportunities—off-highway vehicle use, equestrian, hiking, driving tours, snowmobiling, as well as more "specialty niches" in the future, such as special tours or group events. Recreation demand will be driven from old as well as young, and by specialized populations, such as handicapped persons.

Newcomers have strong environmental values but are not well-acquainted with southern Oregon ecology. Local communities have had varying success in educating newcomers in how to take care of the land. In the Greensprings area, absorption and education of newcomers has been positive, although economics are driving continued logging of private lands. Demands for diverse educational opportunities related to forest management will grow.

The polar positions in regard to CSNM decisions are preservation or production. Each position has articulate representatives. Many Greensprings residents and recreation enthusiasts believe that national designation of the area will create an attraction that will bring further recreational users into the area. They believe that designation on a map will create a destination area of the CSNM area. For many this is positive and represents livelihood opportunities, while for others, increased recreation use should not be promoted (i.e., Soda Mountain Wilderness Council). Production-oriented people, on the other hand, like timber companies and ranchers, are worried about foreclosing options, both for their short-term interests and for the longer term interests of society. They think keeping options open is imporiant for future flexibility. The Jackson County Commissioner representing natural resource issues has also voiced concerns that management options are kept open--ecological integrity can be sustained and still derive some level of human benefit.

Chapter 3 – Alternatives

This Draft Environmental Impact Statement (DEIS) addresses possible management direction that will be used to prepare the Cascade-Siskiyou National Monument (CSNM) Resource Management Plan. Four CSNM management alternatives, including a "No Action" alternative, are described in this chapter. The "No Action" Alternative, Alternative A, will essentially serve as a baseline for most resource and land use allocations. The "No Action" Alternative will allow the reader to compare various strategies for future management. It will not be a "no monument designation" alternative, and it does not provide or create opportunities for enhancement of the Monument values beyond the immediate protective measures of the proclamation. The "Action" Alternatives B, C and D describe various ways activities would be managed in the CSNM. Each alternative has a different emphasis, primarily defined in terms of the types of management necessary to meet the primary goal of protecting, maintaining, restoring or enhancing relevant and important ecological, biological, geological, and archaeological objects.

Designated Areas and Zones

Areas and zones were designated within the CSNM that will be used to identify and/or focus specific management activities. The Soda Mountain Wilderness Study Area (WSA), the Scotch Creek Research Natural Area (RNA) and the Oregon Gulch Research Natural Area were designated prior to the creation of the CSNM and would be managed under specific directions based on the ecological and biological values with their boundaries. Two "Emphasis Areas" are identified that focuses on the management of plant communities to achieve ecological goals. Plant communities outside of the WSA and the RNAs are grouped into the Diversity Emphasis Area or the Old-Growth Emphasis Area (map 41). The grass, shrub, woodland and wet meadow plant communities are placed into the Diversity Emphasis Area. Coniferous forest plant communities are placed in the Old-Growth Emphasis Area. These "Emphasis Areas" are further identified below. The designated areas within the CSNM are:

1)	Soda Mountain Wilderness Study Area (WSA)	6,447 acres
2)	Scotch Creek Research Natural Area (RNAs).	1,800 acres
3)	Oregon Gulch Research Natural Area	1,056 acres
4)	Diversity Emphasis Area (DEA).	19,741 acres
5)	Old-Growth Emphasis Area (OGEA)	23,903 acres
	CSNM Total	52,947 acres

The CSNM has been divided into two management zones that are used when describing proposed management activities that are not necessarily related to vegetation management such as recreational activities, visitor facilities and visual resource management. An east-west oriented line separates the North Zone from the South Zone. This line divides the Upper Emigrant Creek, Keene Creek, Middle Jenny Creek subwatersheds (North Zone) from the Upper Cottonwood Creek, Scotch Creek Camp Creek and Lower Jenny Creek subwatersheds (South Zone). These zones will be referred to during the identification of proposed management activities. See map 42 for the location of these management zones on the landscape. In addition, primary recreation use zones were identified and will be referred to throughout the document designating areas of high visitor use (see map 42).

Wilderness Study Area

The Soda Mountain Wilderness Study Area (WSA) consists of the headwaters of the Dutch Oven Creek, Camp Creek and Salt Creek subwatersheds. The boundary of the WSA is the same as originally identified, however, technical advances in mapping have recalculated the area within the original boundary. Although the original wilderness inventory identified 5,867 acres, technical advances in mapping now put the WSA area within the original wilderness inventory boundary at approximately 6,447 acres. The Soda Mountain WSA was recommended for wilderness designation by the Secretary of the Interior in 1991. The President, in turn, recommended it for wilderness designation to the Congress in 1991. To date no Congressional action has been taken on these recommendations, therefore, the area is managed under the BLM's *Interim Management Policy for Lands Under Wilderness Review*, H-8550-1(USDI 1995d) which outlines what must be done to insure that the Area's suitability for wilderness designation is not impaired by proposed activities. Until Congress acts on the President's recommendation for the Soda Mountain Wilderness Study Area, it is to be managed under the *Interim Management Policy For Lands Under Wilderness Review* and all management implications will be common to all alternatives. As the Soda Mountain Wilderness Study Area is managed according to the Interim Management Policy (IMP), management of this area will not be analyzed any further in this document.

Research Natural Areas

RNAs include the Scotch Creek RNA and the Oregon Gulch RNA. These RNAs were originally designated in the BLM Medford District's RMP (USDI 1995a) and will continued to be recognized within the CSNM as a result of the Memorandum of Understanding between the BLM and The Nature Conservancy (Appendix R). The Scotch Creek RNA consist of 1,800 acres adjacent to the west side of the WSA in the lower reaches of Scotch Creek in Oregon (map 2). The Oregon Gulch RNA encompasses approximately 1,056 acres and is located in the southeastern portion of the CSNM (map 2). Each RNA has its own unique values that address a vegetation cell in the Oregon Natural Heritage Program. The management of each RNA is common to all alternatives as a specific management plan based on the criteria of the Oregon Natural Heritage Program is in Appendix DD and EE.

Diversity Emphasis Area

The Diversity Emphasis Area (DEA) is the land in the CSNM that consists of hardwood, shrub and grass plant communities. There are an estimated 19,741 acres of federal land in the Diversity Emphasis Area with the majority located south of Soda Mountain (map 41).

Unlike conifer communities, grasslands, shrublands, and most woodland plant communities are characterized by large changes in species abundance over relatively short periods of time. This is because many plant species have short life spans, and are dependent on fire and insects for reproduction. Various herbaceous species thrive for only a few years before conditions change enough to prevent growth. Shrub species may become decadent after a few decades, and need to be renewed through activation of their seedbank by fire. Furthermore, many hardwood species are dependent on fire for creating conditions favoring their persistence on the landscape. This condition is best described in terms of fuel-loading. Presently, fire suppression has led to high fuel conditions conducive to intense fires with the potential to kill above-ground parts, as well as latent, below-ground buds.

Management within the DEA will strive to maintain and facilitate ecosystem processes (succession, fire) and ecosystem functioning (nutrient cycling, hydrological cycle) to maintain the patterns of vegetation that sustain the wide range of individual species, habitats, and communities that contribute to local and regional diversity. An emphasis will be placed on maintaining and restoring elements of biological interest mentioned within the Presidential Proclamation for the Cascade-Siskiyou National Monument.

In practical terms, this means recognizing how the landscape has been altered since the settlement of Euro-Americans approximately 150 years ago and using management tools to recreate or maintain the range of plant communities and conditions relating to historic processes. Management will most closely approximate historical processes and the manner in which they interacted with the physical landscape. This will require the use of landscape-level surveys and strategy to create a spatial temporal management plan meeting both stand and landscape-level objectives. Pilot studies will be employed to ensure management actions achieve desired outcomes before implementing treatments on a larger scale.

A generalized "desired future condition" incorporates a reduction of fuel-loading over the landscape, while also creating a range of conditions within the plant communities (relating to plant life-form composition and fuels) across the landscape of the DEA. This strategy is aimed at maintaining shorter-lived and fire-mediated plant species on the landscape as part of the process of managing to maintain plant species, plant communities, as well as, the range of plant and wildlife habitats within the Monument. Reducing and/or eliminating noxious weeds is an critical management component that is a high priority common to all alternatives.

Old-Growth Emphasis Area

The Old-Growth Emphasis Area (OGEA) consists of approximately 23,903 acres of land within the CSNM which is presently late-successional habitat and old-growth (LSOG) coniferous forest or capable of becoming late-successional and old-growth forest (map 41). Before the establishment of the CSNM, most of the Old-Growth Emphasis Area was identified as the Jenny Creek Late-Successional Reserve (LSR). The former Jenny Creek LSR provided a key link between other LSRs in the Cascade and Klamath Mountains (map 52). As a result of this link, and the Proclamation reference to protection and enhancement of old-growth, it is clear that CSNM lands capable of producing late-successional habitat and old-growth forest should be managed for that purpose.

The main goal of LSR management is to maintain, protect, and restore conditions of late-successional and old-growth forest ecosystems in the maximum amounts sustainable through time to promote habitat for late-successional and old-growth associated species. Inherent in meeting this goal is the contribution towards recovery of listed and sensitive species associated with late-successional habitat and old-growth forest. The overriding goal for the Old-Growth Emphasis Area would not change from those of the LSR. Management activities aimed at meeting this goal would not conflict with language set forth in the Proclamation of the Monument and CSNM objects would be protected.

The proposed alternatives for management of the Old-Growth Emphasis Area consider various objectives for accomplishing the goal of maintaining, protecting and restoring late-successional and old-growth forest ecosytems. Alternatives differ based on the intensity of managing specific habitat types and, therefore, the amount of time it will take to accomplish the goal.

Proposed Alternatives

Proposed alternatives and management direction in this plan pertains only to BLM-administered land within the CSNM boundary (map 1). Management of non-federal land within or adjacent to the CSNM boundary will not be addressed in this document. Private land identified for possible future acquisition into the Monument would occur with voluntary participants only, and be conducted in accordance with existing laws and regulation pertaining to federal land exchanges and acquisition of non-federal property. The criteria for the prioritization of land acquisition is listed in Appendix KK.

The alternatives vary in many aspects, but some procedures and actions would be the same in all of the alternatives. Rather than repeat the similar aspects in each alternative description, activities that are the same in all alternatives are summarized in the "Management Common to All Action Alternatives" section found at the end of this chapter. Management for the following issues would be the same regardless of the action alternative (Alternative B-D) selected:

- Management of Aquatic Habitat
- Management of Noxious Weeds
- Management of the Soda Mountain Wilderness Study Area
- Management of Research Natural Areas
- Management of Wildfire Suppression Activities
- Management of Air Quality
- Management of Archeological Sites
- Management of Special Use Activities
- Management of Hyatt Lake Recreation Complex
- Management of Snags and Coarse Woody Debris
- Management of Fish and Wildlife by the State of Oregon
- Management of the Pacific Crest Trail
- Management of Special Status Plants and Animals
- Management of Visual Resources
- Management of Off-Highway Vehicle
- Management of Livestock Grazing
- Management of Visitor Facilities

Rationale for the Preferred Alternative

The process of developing alternatives and selecting the preferred alternative required consideration of various approaches in order to implement Proclamation direction, Federal Land and Policy Management Act (FLPMA), and other applicable mandates, as well as the various objectives. In identifying the preferred alternative, the CSNM Planning Team determined that Alternative C most effectively accomplishes the overall objective of maintaining, protecting, restoring or enhancing the CSNM resources and objects, best addresses the diverse community and stakeholder concerns in a fair and equitable manner, and provides the most workable framework for future management of the CSNM. Although parts of the other alternatives would adequately meet the goal for CSNM, the team felt that Alternative C provides the best foundation on which to build the plan.

The planning team recognizes that the selection of the preferred alternative resulted from qualitative judgement, and that those who are interested in the future management of the CSNM will have different perspectives on the issues addressed in this document. A significant purpose of this process is to facilitate public dialogue on those issues. The information from the public dialogue will be considered in the formulation of the final CSNM Proposed Resource Management Plan/EIS.

ALTERNATIVE A – No Action Alternative

The No Action Alternative describes the current management situation which is essentially the BLM Medford District Resource Management Plan guidance combined with the additional non-discretionary specific direction of the Presidential Proclamation. The No Action Alternative does not provide or create opportunities for enhancement of the monument values beyond the immediate protective measures of the Proclamation. It allows the reader to compare the current interim management with various strategies for future management (Alternatives B, C and D). This alternative will serve as a baseline for most resource and land use allocations.

Vegetation Management

Although the RMP provides for activities to maintain and enhance vegetation, interim management direction deferred activities pending the completion of the CSNM management plan. The exception to the deferred management is the control of noxious weeds. Plant community data collection and monitoring of existing sites continues. Thirteen exclosures have been constructed as part of a study to determine the impacts of grazing on the objects of biological interest in the CSNM. The complete study plan, Draft Study of Livestock Impacts on the Objects of Biological Interest in the Cascade-Siskiyou National Monument (USDI 2001), was released in April of 2001.

Special Forest Products

During interim management, except for administrative purposes and traditional native American gathering, all collection and/or harvesting of Special Forest Products has been deferred pending the completion of the CSNM Resource Management Plan. Under the Medford District RMP, special forest products would be managed for production and sale when demand is present and where actions are consistent with primary objectives for the land use allocation. Permits for various commodities, such as mushrooms or firewood, would be issued for personal use. Principles of ecosystem management are to be used to guide the management and harvest of special forest products.

Management of the Transportation System

Under this No Action Alternative, the transportation system would be managed in accordance with the Medford District RMP while implementing specific direction of the CSNM proclamation. The Medford District RMP objectives are to develop and maintain a transportation system that serves the needs of the users in an environmentally sound manner. Problems associated with high road density would be corrected by emphasizing the reduction of roads where those problems occur (RMP pg 84). Management directions from the RMP that pertain to the CSNM under the No Action Alternative include:

- All motorized vehicles are restricted to designated roads
- The attainment of the Aquatic Conservation Strategy (pg.22, RMP).
- Avoid surface disturbance within special areas and special habitats.
- Minimize new road construction in areas with fragile soils (pyroclastic)...
- Stabilize existing roads where they contribute to significant adverse affects on soils water and fisheries.
- Construct roads in the LSR (now referred to as Old-Growth Emphasis Area) if potential benefits of silviculture, salvage, and other activities exceed the cost of habitat impairment.
- Reduce existing road mileage within key watersheds.
- Follow best management practices (in Appendix D of RMP)...to mitigate adverse

effects on soils, water, fish, and riparian habitat during road construction and maintenance.
- Determine necessity of road systems to meet initial wildfire suppression objectives prior to any prepared closure or modification.

These are the main directives in the RMP that pertain to the transportation system, for all of the management directives refer to the RMP (pages 86 through 88). Since the implementation of the RMP (1995), approximately 77 miles of roads have been temporarily closed.

The Best Management Practices for roads pertaining to this area include:
- Use seasonal restrictions on all unsurfaced roads.
- Surface inadequately surfaced roads that are to be left open to traffic during wet weather.

The following interim management practices were implemented after the establishment of the CSNM and are in accordance with the Proclamation or protective measures taken to maintain the integrity of the landscape while the resource management plan is being developed. The emergency closure of these roads were published in the *Federal Register* (Volume 65, Number 171) on September 1, 2000.

- Closed Schoheim road (41-2E-10.1), except between the southwest section line of T.40S.,R.4E.,Sec.4 and the Copco road where it provides access to private property.
- Closed Randcore Pass Road (40-4E-19.2) past the junction with road 40-4E-31.0
- Closed Skookum Creek road (40-2E-28 and 40-3E-27.2) past the junction with road 40-3E-27.1
- Closed road 41-2E-3.0 past the point where it crosses the Pacific Crest National Scenic Trail
- Closed road 41-3E-9.0 past the barricade in T.41S., R.2 E., Section 9, SW1/4NW1/4
- Closed Lone Pine Ridge Road (40-3E-31) past the block in T40S, R3E Section 31
- Closed an un-numbered road which crosses the Oregon-California border at the section line between sections 7 and 18, T.41S., R.4E.
- Closed an un-numbered road which crosses the Oregon-California border at the south section line of Section 13, T.41S., R.2E.

Mechanized Recreation

All motorized and mechanized vehicles are prohibited off designated roads (refer to transportation systems and map 30 for roads designated for use). Under interim management, snowmobiles are allowed on roads in the designated areas listed on map 53. Prior to the Proclamation cross country travel by snowmobiles was permitted when the snow depth was greater that 12 inches. The use of mountain bicycles are restricted to roads designated open to public access (Plate 1).

Non-Mechanized Recreation

Non-mechanized recreation including hiking, backpacking, camping, rock climbing, hang gliding, para-sailing, and picnicking is unrestricted across the CSNM. These activities in the RNAs must not interfere with the protection and maintenance of the key characteristics of these areas. The Pacific Crest National Scenic Trail is the only officially desigated hiking trail within the CSNM.

Recreational Animal Stock Use

Recreational animal stock use is allowed throughout the Monument but must not interfere with protection and maintenance of key resource characteristics in the RNAs. No commercial recreational animal stock use would be authorized pending the completion of the CSNM management plan.

Visitor Facilities

Visitor facilities currently used for the CSNM are the BLM Medford District Office and the Hyatt Lake Recreational Complex. The BLM office in Medford supplies maps and brochures and visitors can talk to monument staff about specific points of interest. Maps and brochures are available at the Hyatt Lake Recreational Complex. The State of Oregon's Visitor Center, located in Ashland, also serves as a site where maps and brochures about the CSNM are disseminated. Current guidance on visitor use include:

- No parking off of roads except at designated sites
- New parking/trailhead facilities allowed only as needed for resource protection
- New toilet facilities would be furnished as needed for resource protection
- Continue use and maintenance of existing signs/interpretive sites for protection of Monument objects and to provide travel information
- New interpretive sites could be developed consistent with the protection of Monument objects
- New signs would be installed only for the protection of CSNM objects and public safety

Management of Linear Rights-of-Way and Communication Sites

The Proclamation establishing the Monument states: "The establishment of this monument is subject to valid existing rights (VER). Valid existing rights include a variety of BLM authorizations such as right-of-way grants, leases, permits and reciprocal agreements. Private land owners within the Monument are assured access to their property as existing law requires the Bureau of Land Management to provide reasonable access to non-federally owned land that is surrounded by public land.

Under the No Action Alternative, the BLM would continue to accept applications for BLM administered lands where they are consistent with local comprehensive plans, Oregon Statewide planning goals and rules, and the Medford District RMP policy identifying those areas to exclude or avoid. Land use allocation directions which would apply to the CSNM are:

Continued allocation of those lands which support existing rights-of-way corridors and communication sites.

- Subject to all VERs, exclude rights-of-way in the following areas:
  - Research natural areas
  - Wilderness study areas
  - Visual resource management Class I areas
  - Known special status plant species sites

- Subject to all VERs, avoid rights-of-way in the following areas:
  - Recreation sites
  - Sensitive species habitat
  - Visual resource management Class II areas
  - Known wetlands
  - Jenny Creek LSR (now called Old-Growth Emphasis Area)

Rights-of-way may be granted in avoidance areas, listed above, when no feasible alternate route or designated rights-of-way corridor is available.

Rights-of-way must avoid adverse effects that retard or prevent attainment of the Aquatic Conservation Strategy and riparian reserves objectives. Where legally possible adjust existing rights-of-way to eliminate adverse effects that retard or prevent the attainment of the Aquatic Conservation Strategy and riparian reserves objectives. If adjustments are not effective and where legally possible, eliminate the activity.

- The access road (no BLM number) to the Soda Mountain summit from the Soda Mountain Road (39-3E-32.3) would be maintained and repaired to reduce the erosion/sediment source problem.

The No Action alternative would continue current levels of maintenance, access, and other established uses consistent with the Medford District's RMP and VERs.

ALTERNATIVE B

Alternative B promotes natural ecosystem processes in the management of plant communities. One exception to this philosophy would be in the management of young conifer stands that exist as a result of past management practices. In the young conifer stands, active management would be implemented to ensure the establishment of conifer trees. Activities such as recreation and visitor use are not promoted and accommodations for these uses would be minimal. The transportation system would be maintained at minimal levels mainly for resource protection and many roads would be closed and/or naturally decommissioned.

Vegetation Management within the Diversity Emphasis Area

Under Alternative B, limited management intervention allowing natural processes would be used to attain plant community diversity. The only management activities that would occur across the landscape in the Diversity Emphasis Area (DEA) are survey/monitoring of plant communities (including listed and sensitive plant species) and noxious weed control. Noxious weed control would conform to standards set forth in the BLM Medford District's Integrated Weed Management Plan (see Appendix S). Although common to all alternatives, noxious weed control would be the primary vegetation management objective in Alternative B. The remainder of the management objectives to meet "desired future conditions" would be attained through natural processes. Refer to table 3-1 for the management objectives for the Diversity Management Area.

List of tools available to meet defined management objectives

In order to minimize soil surface disturbance, this alternative limits the number of tools available for noxious weed control including bio-control, hand-pulling, and herbicides within the context of the following management strategy.

Vegetation Management Strategy

- Maintain healthy herbaceous plant communities as a barrier to weed invasion by minimizing ground-disturbing activities. Eliminate isolated noxious weed patches placing an emphasis on management tools that minimize soil surface disturbance (bio-control, hand-pulling, and herbicides).

- Sow with native herbaceous seed (from local seed sources) where natural ground-disturbance requires rehabilitation. Maintain a source of native herbaceous seed for emergency rehabilitation/restoration.

- Isolate and contain extensive noxious weed patches (greater than 1 acre) - ensure no motorized vehicle, cycling, hiking, livestock thoroughfare, particularly during the wet season.

- Create a long-term, site specific restoration/management strategy for each extensive noxious weed patch which includes:
  - Apply treatment method(s) most suited to species and location on the landscape
  - Monitor efficacy of treatments and alter management strategy as needed
  - Anticipate several years of treatment application necessary for the control of non-desired species/seedbank.

- Proposed management actions for noxious weed control would be applied to small study areas before application to the larger landscape.

- Establish a database of plant communities and ecological processes through surveys and monitoring.

Table 3-1. Grass/Shrub/Woodland Plant Community Management Objectives

Management Objectives	Action/Tools
Control noxious weeds	Use of bio-control, hand pulling methods and/or herbicides
Establish database of conditions of plant communities	Survey and monitor plant communities and populations of listed and sensitive plant species

Vegetation Management of Old-Growth Emphasis Area

Alternative B focuses on promoting continued and accelerated development of late-successional and old-growth habitat by treating the early to mid-seral stage conifer stands that have potential of becoming late-successional and old-growth habitat (habitat type 3). The first priority would be the reforestation of land with the potential to produce late-successional and old-growth habitat. Reforestation techniques including site preparation, tree planting, cutting competing vegetation, and animal control would be implemented where stand replacement events such as past clear-cutting or wildfires have occurred.

The second priority would be to implement density management treatments of established conifer stands in habitat type 3, either plantations or natural stands, in order to accelerate their development towards late-successional and old-growth habitat. Young stands (those generally less than 30 years old in habitat type 3) are presently at high tree densities that will not allow them to develop into late-successional and old-growth given historic processes (Sensenig 2000). Many of the habitat type 3 lands are pine plantations between 10 and 30 years of age. More rapid pine growth and subsequent increases in canopy depth accelerates ingrowth of Douglas-fir and white fir in the understory of pine plantations in the CSNM. Thinning pine plantations to preferred levels accelerates growth and increases vigor over time (Oliver 1979). Thinning pine pole stands is to reduce the risk of beetle attack (Cochran and others 1993). These techniques apply to natural stands and plantations. Density management techniques involves the reduction of competing vegetation including thinning (cutting down) conifer trees of less than average stand size that are growing too close together. All thinning treatments proposed in Alternative B would be non-commercial (less than 7" dbh). Approximately 3,400 acres (90 percent) of habitat type 3 would be treated over the next 10 years.

Excessive slash created by brush removal and density management activities would be treated (in many cases by prescribed fire) in order to reduce the fuel loading and wildfire hazard. Monitoring would be essential to determine the effectiveness of treatment and recording the progression of the stands toward meeting the Old-Growth Emphasis Area goal.

The following prioritized criteria would be used when identifying treatment areas to meet Old-Growth Emphasis Area goals under Alternative B.

1) Where recent stand replacement events have occurred and it is determined that some treatment is needed to help re-establish trees.

2) Those ecoregions within the CSNM that currently lack late-successional and old-growth habitat and have relatively high amounts of potential habitat (habitat 3).

3) Young stands (habitat type 3) that need to be treated to increase tree growth in order to accelerate the development of late-successional and old-growth habitat characteristics or to reduce moderate to high levels of insect and disease related mortality.

4) Where treating early-successional forest is adjacent to (generally within 1/4 mile) existing late-successional and old-growth, such that treating it would lead to development of larger blocks of late-successional and old-growth habitat.

5) Stands within riparian reserves and subwatersheds lacking late-successional and old-growth habitat and/or desired structures.

Special Forest Products

There would be no collection of special forest products from the CSNM under this alternative except for traditional native American gathering or administrative purposes such as research and monitoring

Transportation System

Under Alternative B, the transportation system would be managed as shown on map 31. The objectives are to maintain the minimal transportation system necessary to facilitate meeting the goal of protection and maintenance of Monument resources. Problems associated with high road density would be corrected by emphasizing the reduction of roads where those problems occur.

Management directions under Alternative B include (for all of the management directives refer to Appendix CC):

- All mechanized vehicles are restricted to designated roads.
- The attainment of Monument Aquatic Conservation Strategy Objectives (see Appendix BB).
- Avoid special areas and special habitats.
- Minimize new road construction. Construct roads in the Monument only if potential ecological benefits exceed the effects of habitat impairment unless required by Valid Existing Rights (VERs)
- Stabilize existing roads where they contribute to adverse affects on soils, water and fisheries.
- Where legally possible, reduce the amount of existing roads in the CSNM particularly where road densities are greater than 2 miles per section.

- Follow best management practices (in Appendix AA)to mitigate adverse effects on soils, water, fish, wildlife, and riparian habitat during road construction and maintenance.
- Determine necessity of road systems to meet initial wildfire suppression objectives prior to any planned closure or modification.

Best Management Practices for roads would include:

- Surface roads that are to be left open to traffic from October 15 through May 15.
- Roads that are not adequately surfaced would be closed from October 15 through May 15.

Transportation Management Objectives are shown on Map 31. Major roads of concern are listed below with recommended treatments:

- Schoheim road (41-2E-10.1); the western portion would be closed and left to decommission naturally, the eastern portion would be closed for use by unauthorized vehicles except between the southwest section line of T.40S.,R.4E.,Sec.4 and the Copco road where it provides access to private property.
- Pilot Rock Road (41-2E-3.0) past the point where it crosses the Pacific Crest National Scenic Trail would be closed and left to decommission naturally
- Close the Pilot Rock access road (BLM #40-2E-33) where it intersects old Highway 99 with a gate to prevent vehicle access.
- Randcore Pass Road (40-4E-19.2) past the junction with road 40-4E-31.0 would be closed for use by unauthorized vehicles.
- Skookum Creek road (40-2E-28 and 40-3E-27.2) past the junction with road 40-3E-27.1 would be closed for use by unauthorized vehicles.
- Road 41-3E-9.0 past the barricade in T.41S., R.2E., Section 9, SW1/4NW1/4 would be closed and left to decommission naturally.
- Lone Pine Ridge Road (40-3E-31) past the block in T.40S., R.3E., Section 31 would be closed and left to decommission naturally.
- The un-numbered road which crosses the Oregon-California border at the section line between sections 7 and 18, T.41S., R.4E. would be closed for use by unauthorized vehicles.
- The un-numbered road which crosses the Oregon-California border at the south section line of Section 13, T.41S., R.2E. would be closed and left to decommission naturally.
- Seasonally (Oct.15 - May 15) close the Pilot Rock jeep road with gates.

Mechanized Recreation

In the Proclamation creating the CSNM, the Secretary of the Interior was directed to "prohibit all motorized and mechanized vehicle use off-road..." As a result, all mechanized forms of recreation are restricted to designated roads which are open for public access. These roads are identified in the transportation plan. Included in this category are mechanized vehicles of all types including snowmobiles and mountain bikes. No off road travel by any of these vehicles is allowed in CSNM. In this alternative, Alternative E, no roads would be designated for snowmobile use thus the Monument would be closed to snowmobiles.

Non-Mechanized Recreation

Included in this category are such forms of recreation as hunting, fishing, camping, hiking, technical rock climbing, bungee jumping, hang gliding, and para-sailing. Recreational animal stock use will be covered separately below.

Under this alternative, camping would only be allowed at the existing campgrounds in the Hyatt Lake Recreation Complex and along the PCNST. Campfires are restricted to existing fire pits at the Hyatt Lake Recreation Complex and "leave no trace" campfires are allowed in association with PCNST camping.

The only existing designated hiking trail within the CSNM is the Pacific Crest National Scenic Trail (PCNST). There are two officially designated side trails associated with PCNST in the CSNM at Hobart Bluff and Wildcat Hills. Under this alternative, no new hiking trails would be constructed or designated. An existing trail created by repeated use but not built to BLM standards and maintained could be in existence but is not recognized or designated by BLM as a trail. Hiking is unrestricted in the Monument except within RNAs where it is restricted to existing roads/trails.

Hunting and fishing regulations are set by the State of Oregon and this plan does not address those regulations.

Technical rock climbing, hang gliding, para-sailing/gliding, bungee jumping are not compatible with the objectives of the CSNM under this alternative and therefore are not allowed.

Additional forms of recreation which are not addressed or new forms that may be created in the future would be prohibited until adequately evaluated in relationship to the CSNM management objectives.

Recreational Animal Stock Use

Under this alternative all animal stock use is prohibited. This includes horses, llamas, goats, mules, donkeys, dogs, camels, elephants, and bison. Concerns over grazing, noxious weeds, nutrient loading from droppings, and damage to soils, water and traditional root crops are associated with these animals. This would also apply to commercial sled dog and sleigh ride activities which were permitted in the past around Hyatt Lake.

Visitor Facilities

This alternative allows for the use of existing federal government facilities (within and outside of the Monument - without improvements or alterations) as part of the Monument visitor services and interpretation program. The BLM Medford District Office would remain the Monument headquarters and primary point of information for visitors. The Hyatt Lake Recreation Complex administration building would be used as a contact point for monument visitors in addition to its normal operations. The State of Oregon's Welcome Center located in the Forest Service's Ashland Ranger District office would continue to be used to disseminate information pertaining to the Monument such as maps and brochures.

Alternative B provides for the maintenance of existing designated trailhead and parking facilities on BLM land in the CSNM. Maintenance for resource protection and safety would be allowed, but alterations, expansion, or new construction at these or any other sites within the Monument would not be allowed under this alternative. No new permanent or temporary toilets would be located at any of these sites. No drinking water sources would be developed for any of the designated sites. Parking off-road would be permissible only at existing designated sites. Any existing, non-designated off-road parking would not be authorized for use and may be signed and rehabilitated accordingly. Existing parking and trailhead sites, within the CSNM, that will hereafter be considered as designated include:

- PCNST parking aong the Soda Mountain Road (39-3E-32.3): [T40S, R3E, Section 16]

- PCNST parking at Porcupine Gap along the (40-2E-33-3.0) Road: [T40S, R2E, Section 35]
- Horse Corrals along old Highway 99: [T 41S, R2E, Section 9]
- Parking within designated areas in the Hyatt Lake Recreation Complex: [T39S,R3E,Sections 15, 21, 22]

This alternative provides for the continued use and maintenance of existing interpretive sites and signs for travel, safety, resource protection, and visitor information. No new interpretive sites would be developed within the CSNM under this alternative. New signs would be limited to those necessary for protection of the monument resources and public safety.

Management of Linear Rights-of-Way and Communication Sites

The Proclamation establishing the Monument states: "The establishment of this monument is subject to valid existing rights (VER). Valid existing rights include a variety of BLM authorizations such as right-of-way grants, leases, permits and reciprocal agreements. Private land owners within the Monument are assured access to their property as existing law requires the Bureau of Land Management to provide reasonable access to non-federally owned land that is surrounded by public land.

Under this alternative, BLM would issue no new authorizations for either linear rights-of-way or communication sites on public lands. There would be no expansion of existing facilities or construction of new facilities at either of the two communication sites i.e. Soda Mountain and Chestnut Mountain. The access road (no BLM number) to the Soda Mountain summit from the Soda Mountain Road (39-3E-32.3) would be maintained and repaired to reduce the erosion/sediment source problem.

Alternative B would continue current levels of maintenance, access and other established uses consistent with valid existing rights.

ALTERNATIVE C

Alternative C is the preferred alternative. It incorporates active management for protection and maintenance of the conifer communities while limiting some ground disturbing management tools that may be used in maintaining and restoring the other plant communities. Recreation and visitor use is accommodated at levels that don't interfere with protection, maintenance and/or restoration of Monument resources. The transportation system would be managed to accommodate visitor use and safety while closing and decommissioning roads (both mechanical and natural) in order to protect Monument resources.

Vegetation Management in the Diversity Emphasis Area

Alternative C seeks attainment of Monument objectives through direct management intervention. However, tools are restricted to those resulting in minimal soil surface disturbance so as to minimize weed invasion and facilitate the natural process of plant community succession. Alternative C strives to maintain individual plant species, plant communities, as well as the full range of plant and wildlife habitat characteristics of each plant community within the Monument. Natural processes such as fire will be mimicked as closely as feasible. Other processes such as weed invasion will be controlled to minimize impacts to natural ecosystem processes. In comparison to

Alternative B, active management would be implemented to maintain and restore a range of plant community conditions. A limited range of tools would be available to facilitate management intervention where monitoring has indicated undesirable plant community and wildlife habitat conditions. Management objectives for the plant communities are listed in Table 3-2.

List of management tools available to meet defined management objectives

Alternative C allows limited ground-disturbance, but excludes the use of heavy machinery except for maintaining, repairing or decommissioning roads, use in rock quarries or for pond/pump-chance maintenance, repairs or rehabilitation/restoration. Management tools for this alternative include: manual weeding, prescribed fire, fence construction, manual thinning, helicopters, herbicide application (for weed control only), native plant establishment, weed-eater, chainsaws, and handheld auger.

Vegetation Management Strategy

- Maintain healthy herbaceous plant communities as barrier to weed invasion by limiting ground-disturbing activities. Eliminate isolated mono-culture weed patches using identified management tools.

- Sow with native herbaceous seed (from local seed source) where natural ground-disturbance requires rehabilitation. Maintain a source of native herbaceous seed for emergency rehabilitation/restoration.

- Isolate and contain extensive weed patches (greater than 1 acre)
  - ensure no motorized vehicles, cycling, hiking, and livestock thoroughfare particularly during the wet season.

- Create a long-term, site specific restoration/management strategy for each extensive noxious weed patch which includes:
  - Apply treatment method(s) most suited to species and location on the landscape
  - Monitor efficacy of treatments and alter management strategy as needed
  - Anticipate several years of treatment application necessary for the control of non-desired species/seedbank.

- Proposed management actions for weed control would be applied to small study areas before application to the larger landscape.

- Establish a database of plant communities and ecological processes through surveys and monitoring.

- Improve condition of stands with mixture of weeds and remnant native herbaceous species using identified management tools.

- Survey wet meadows, seeps, and springs to quantify restoration needs. Initiate restoration of hydrological functioning where necessary.

- Survey riparian vegetation, particularly along the 303(d) listed streams.

- Survey, protect and/or restore endemic plant species including listed and Bureau special status plants.

- Restoration activities would be tailored to maintain or enhance populations of listed and Bureau special status plants.

- As new information is received, adapt long-term management plan for maintaining a range of conditions/habitats within plant communities of the Monument.

Table 3-2. Grass/Shrub/Woodland Plant Community Management Objectives

Management Objective and Conditions	Action/Tools
Grasslands	
Foothill Mountain Grasslands, Steep Mountain Grasslands, and Biscuit Scablands represent some of the most fire-dependent plant communities of the CSNM landscape. Fire suppression, weed invasion and livestock grazing have contributed to the deterioration of all or part of these communities. Many lower elevation communities in the Agate Flat area are under annual grass monoculture, or have annual grasses as a dominant component. Where native grass and forb species still dominate the herbaceous layer of plant communities, prescribed fire treatments will be distributed across the landscape to facilitate the co-existence of short-term fire-dependent species (short-lived forbs and grasses utilizing ephemeral habitats created by fire) together with species able to persist in the longer-term without fire (long-lived perennial grasses, woody species). The following objectives are common to all grasslands, open shrublands, and open woodlands.	
Maintain and Protect existing native grasslands: Most grasslands are maintained by disturbance. Fire plays a critical role in the individual species ecology of grassland dwelling species (vigor, seedset, tillering ability, successful seed germination). Careful survey monitoring for signs of degradation (weed invasion, litter buildup, and increased woody canopy) and timely action may be necessary to maintain existing native grasslands.	Treat up to 20 percent of the native grasslands within each subwatershed (map 13) of the CSNM in the next 10 years. Prescribed fire would be the first tool used to remedy signs of degradation. Manual treatment (piling and burning) could be used where broadcast fire cannot be safely prescribed. Treatment application during the summer dormant season is most favorable, but not always feasible due to dry conditions. Treatments would most likely occur in the fall or spring. Pilot studies are a pre-requisite for treating areas greater than 20 acres.
Improve native grass/annual grass mix to native grass domination: Annual grasses can invade decadent native grasslands following long-term fire suppression, or low vigor grasslands following long-term livestock impact. Defoliation treatments can be timed to reduce annual grass seedset, but maintain native perennial grass seedset and vegetative tillering. Local conditions may necessitate multiple treatment types (eg., it is unlikely that fuels would allow the application of fire for 2-3 consecutive years).	Within the next 10 years, treat up to 15 percent of the native grasslands within each subwatershed (map 13) that are being invaded by annuals. Apply spring/early summer defoliation treatments (fire) to prevent annual grass seedset. Two applications may be necessary. Treatments may need to continue for two or more years. Native grass seed application may be necessary in patches of annual grass domination.
Restore annual grass monoculture to native grass domination: The low success rate of treatments attempting to meet this objective makes this a low management priority. Dense stands of early germinating/maturing annual grasses easily out-compete native grasses seedlings for water and nutrients. The presence of medusahead exacerbates the problem through establishment of a thick duff layer.	Treat up to 10 percent of the annual grass monoculture areas within each subwatershed of the CSNM in the next 10 years. At least three years of defoliation treatment and/or herbicide application are necessary to control the seedbank prior to successful native grass establishment. Native grass seed application is an essential part of any restoration effort. (see Weed Mgt. Plan, Appendix GG).

Table 3-2. Grass/Shrub/Woodland Plant Community Management Objectives

Management Objective and Conditions	Action/Tools
Wedgeleaf ceanothus stands are the most common shrubland of the CSNM landscape. Low statured hardwood stands (eg. rosaceous chaparral) are also considered to constitute shrublands. Fire suppression has created a preponderance of older aged shrub stands. The relative scarcity of rosaceous chapparal implies a restriction on management beyond small pilot studies aimed at a further understanding of their plant community dynamics. Since the life-cycle of shrublands includes a stage of grass domination following fire, all grassland management objectives also apply to shrublands.	
Recreate a range of wedgeleaf ceanothus stand ages across the landscape: The long-term management plan will maintain a range of shrub stand ages between 0 and 50 years old with equal distribution across decadal classes. Short fire-return intervals may prevent sexual reproduction of established shrubs, thereby resulting in their local extirpation.	Treatment of up to 20 percent of the wedgeleaf ceanothus stands within each subwatershed of the CSNM would occur within the next 10 years. Use broadcast fire or manual cutting, piling and burning to reinitiate stands of shrubs. Fire return intervals of more than 5 years are preferred. A survey of all wedgeleaf ceanothus stands (stand age, stand cover) and their understory are a prerequisite for creating a long-term shrubland management plan.

Woodlands

A large range of woodland types exist in the CSNM, including Oak-Bunchgrass, Oak-Juniper-Fescue, Oak-Pine-Fescue, Oak-Pine-Oatgrass, Pine-Oak-Terrace, Pine-Oak-Fescue, and Oak Mahogany Fescue. These communities integrade with grasslands and shrublands. Consequently, management objectives for grasslands and shrublands are also pertinent to woodlands.	
Conifer invasion: Mesic (relatively moist) oak woodlands are subject to conifer invasion as a consequence of fire-suppression. A full inventory of conifer invaded oak woodlands is necessary before the application of prescribed fire.	Upon completion of an inventory, up to 25 percent of the oak woodlands within each subwatershed (map 13)being invaded within CSNM would be treated during the next 10 years. Prescribed broadcast fire is the best tool for reducing conifer canopy cover within oak woodlands. Manual treatments (cutting, piling and burning) can be used where broadcast fire cannot be safely reintroduced.
Shrub invasion: Fire suppression has resulted in increased cover by shrubs within formerly open woodlands. Where fuel-loading threatens to result in a stand-replacement wildfire event, manual thinning could be used to reduce fire-hazard and induce vigorous shrub growth.	Treat up to 20 percent of shrub invaded areas within each subwatershed (map 13)of the CSNM would be treated in the next 10 years. Several woodland prescriptions have been successfully implemented within the Applegate Adaptive Management Area using broadcast burning and manual treatments (cut, pile and burn). Similar prescriptions could be used in the CSNM.

Table 3-2. Grass/Shrub/Woodland Plant Community Management Objectives

Management Objective and Conditions	Action/Tools
Loss of 'open oak savanna' communities: Where some oak woodlands were once characterized by open spaces, fire suppression has resulted in a proliferation of a younger age class (<130 years) of Oregon white oak, especially in more mesic oak woodlands. Increased stand density is believed to have reduced acorn production, an important food source for wildlife. Remaining stands of native herbaceous understory are frequently associated with Oregon white oak canopy. Thinning of dense Oregon white oak stands to historical tree density should only occur providing there is no loss of the native herbaceous component within newly created interspaces.	Treatments should be restricted to pilot studies and monitored for at least five years (acorn production, understory and overstory composition) prior to larger scale treatment application. If pilot studies are successful, treat 10 percent of the dense stands within each subwatershed (map 13) in the next 10 years. Prescribed broadcast fire is the best tool for reducing stand density within oak woodlands. Manual treatments (cutting, piling and burning) can be used where broadcast fire cannot be safely reintroduced.
Wetlands, Riparian Vegetation, Floodplains, Springs and Seeps	
This category represents a wide range of plant communities. All have been impacted by past livestock management, pond construction, and diversion through road construction. Apart from the former Box-O Ranch, most riparian overstory remains intact. Livestock exclusion, or finer control of timing and intensity of grazing will allow for a rapid recovery of these plant communities. There is a strong possibility that these communities house a range of endangered and survey and manage mollusks.	
Facilitate wetland and riparian plant recovery: The effects of improper livestock grazing is the greatest encumbrance to the recovery of wetland plant communities.	Complete a survey on all wetland and riparian plant communities and restore hydrologic functions of impacted areas immediately. Use fencing to exclude livestock, and/or alter the livestock management to facilitate wetland plant community recovery including herding and salting.
Repair of hydrological functioning: Most wetland and riparian plant communities suffering from altered drainage due to culvert and/or road construction will regain a suitable plant community composition following correction of drainage problems.	Complete a full inventory of wetland plant communities to assess the need for drainage reparations. Rehabilitate drainage problems associated with roads using mechanized equipment. Less ground disturbing methods such as horses or helicopters may be used in some instances for adding woody material or other structures.
Re-establishment of riparian woody vegetation: This is primarily a serious problem on the former Box-O Ranch. Grazing deferment has resulted in improved conditions. Isolated seeps and springs may need planting of suitable woody species.	A full inventory of woody vegetation of all wetlands, riparian vegetation, springs and seeps is required before any management intervention (replanting, weed control).
Repair of ponds and pump chances: Ponds and/or pump-chances would be improved, reconstructed or decommissioned to allow a recovery of the former plant communities.	Complete surveys to determine restoration needs. Immediately repair impacted areas as soon as possible. The use of mechanized equipment would be allowed to accomplish objectives.

Table 3-2. Grass/Shrub/Woodland Plant Community Management Objectives

Management Objective and Conditions	Action/Tools
Floodplain restoration: Historical pasture creation has greatly reduced the extent of former hardwood floodplain communities. The former Box-O Ranch is a prime area for restoration. Current management is allowing the re-establishment of re-sprouting and seed reproducing hardwoods and shrubs (white alder, maple Oregon ash, willow, and mock-orange). A planting program is establishing a conifer component. A long-term goal envisions a mature riparian hardwood dominated forest intergrading with oak woodlands within the extended floodplain.	Continue riparian planting program and manage bottomland pastures to allow for woody tree establishment. Initiate an extended floodplain planting program. This includes management of understory as well as tree planting. Native perennial grasses should be established following recommendations for grassland management. Establish Oregon white oak by using a hand held power-driven auger to drill through the hard clay pan to allow easier growing conditions and tree establishment.

Vegetation Management in the Old-Growth Emphasis Area

Under Alternative C, the main objective is protecting existing and potential late-successional and old-growth habitat from the threat of habitat loss due to catastrophic disturbance (i.e., intense wildfire). This would be accomplished by reducing the fuel loading in all stands (habitat types 3,4,5&6) with high fire hazard that are within 1/4 mile of existing late-successional and old-growth habitat (habitat types1&2). In some cases, thinning (both non-commercial and commercial) of vegetation in these stands (habitat types 3,4,5&6) may occur before the fuel reduction techniques are implemented to reduce the fuel ladder and amount of live fuel. In addition, forest stands in habitat type 3 that have moderate fire hazard and that are within 1/4 mile of existing late-successional and old-growth habitat would be treated as described above to further reduce fuel loading and accelerate progression toward desired old-growth stand characteristics. Up to 2,000 acres of these habitat type 3 stands would be treated within the next 10 years.

In order to protect existing late-successional and old-growth habitat (habitat type 1&2), fuel treatment would occur within late-successional and old-growth habitat that has high fire hazard (see map 45). Non-commercial thinning of vegetation could occur in some of these stands prior to fuel treatment if necessary. Special attention would be given to reducing the non-fire dependent (mainly white-fir) component of existing late-successional and old-growth habitat which could be accomplished through manually cutting individual trees (non-commercial) or prescribed understory broadcast burning. Thinning from below would decrease the fuel ladder by increasing crown base height and changing species composition to lighter crowned and fire adapted species (Graham 1999). Up to approximately 1,770 acres of habitat type 1&2 would be treated within the next 10 years to accomplish this objective. The manipulated stands would be monitored for effectiveness of the treatment and to record their progression toward attaining and/

or maintaining late-successional and old growth habitat characteristics. Refer to Table 3-3 for a summary of potential treatments for meeting late-successional and old-growth protection.

The following prioritized criteria would be used when identifying treatment areas to accomplish Old-Growth Emphasis Area goals under Alternative C.

1) The overriding priority would be the reduction of high fuel hazards along the ridge line that separates the north/south management zones.
2) Treatment of activity fuels (excess slash that results from stand treatments).
3) Where recent stand replacement events have occurred and it is determined that some treatment is needed to help re-establish trees.
4) Treatment of all stands with high fire hazard within 1/4 mile of late-successional and old-growth habitat (type 1&2).
5) Treatment of forest stands in habitat type 3 that have moderate fire hazard and that are within 1/4 mile of existing late-successional and old-growth habitat.
6) Treatment of existing late-successional and old-growth habitat (habitat types 1&2) to reduce high fuel hazard. Non-commercial thinning may occur in some of these stands before fuel treatments to reduce the white fir components within late-successional and old-growth habitat at risk due to density (decreased vigor), insect infestation, disease, or fuel ladders.
7) Effectiveness monitoring of all treated sites.

Table 3-3. Summary of Potential Treatments for Late-Successional and Old-Growth Protection in Alternative C

Habitat Type	Possible Treatments over next Decade	Potential Acres	Percent of Habitat Potentially Treated
1 & 2	• Reduction of Fuel Component • Non-Commercial thinning	1,770	15
3	• Treat all habitat with moderate & high fuel hazard within ¼ mile of habitat 1&2 for fuel reduction • Commercial & Non-Commercial thinning could occur prior to fuel treatment	2,346	62
4	• Treat all habitat with high fuel hazard within ¼ mile of habitat 1&2 for fuel reduction	2,614	14
5	• Treat all habitat with high fuel hazard within ¼ mile of habitat 1&2 for fuel reduction • Possible Commercial & Non-Commercial thinning	839	10
6	• Treat all habitat with high fuel hazard within ¼ mile of habitat 1&2 for fuel reduction	157	14
Total of CSNM outside of WSA & RNAs		**7,726**	**18**

Special Forest Products

No commercial collection of any special forest products would be allowed within the CSNM. Fungi/mushroom collection for personal use would be allowed. Special use permits would be issued for the collection of plant materials including fungi/mushroom when used for traditional native American gathering or administrative purposes (including approved research projects). During thinning and fuel management activities, in areas where adequate levels of coarse woody debris exist, firewood would be moved to slash decks. Permits would be issued to cut firewood in these slash decks. Permits for the collection of rocks/gems and petrified wood would be issued in pre-designated areas for educational purposes as long as the collection does not interfere with protection of Monument resources.

Transportation System

Under the Alternative C, the transportation system would be managed as shown on map 32. The objectives are to maintain the minimal transportation system necessary to facilitate meeting the overall goal of protection, maintenance and restoration of Monument resources. Problems associated with high road density would be corrected by emphasizing the reduction of roads where those situations occur.

Primary management directions under Alternative C include (for all of the management directives refer Appendix CC):

- All mechanized vehicles are restricted to designated roads.
- The attainment of Monument Aquatic Conservation Strategy Objectives (see Appendix BB).
- Avoid special areas and special habitats.
- Minimize new road construction. Construct roads in the Monument only if potential ecological benefits exceed the effects of habitat impairment unless required by Valid Exiting Rights (VERs)
- Stabilize existing roads where they contribute to adverse affects on soils, water and fisheries.
- Where legally possible, reduce the amount of existing roads in the CSNM particularly where road densities are greater than 2 miles per section.
- Follow best management practices (in Appendix AA) to mitigate adverse effects on soils, water, fish, wildlife, and riparian habitat during road construction and maintenance.
- Determine necessity of road systems to meet initial wildfire suppression objectives prior to any planned closure or modification.

Best Management Practices for roads would include:

- Surface roads that are to be left open to traffic from October 15 through May 15.
- Roads that are not adequately surfaced would be closed from October 15 through May 15.

Transportation Management Objectives are shown on Map 32. Major roads of concern are listed below with recommended treatments:

- Schoheim road (41-2E-10.1); the western portion would be closed and mechanically decommissioned, the middle portion would be closed and left to decommission naturally, the eastern portion would be closed for use by unauthorized vehicles except between the southwest section line of T.40S.,R.4E.,Sec.4 and the Copco road where it provides access to private property.

- Pilot Rock Road (41-2E-3.0) past the point where it crosses the Pacific Crest National Scenic Trail would be closed and mechanically decommissioned.
- Maintain Pilot Rock access road (BLM #40-2E-33) in current condition and acquire full public access.
- Randcore Pass Road (40-4E-19.2) past the junction with road 40-4E-31.0 would be closed for use by unauthorized vehicles.
- Skookum Creek road (40-2E-28 and 40-3E-27.2 Segment A) past the junction with road 40-3E-27.1 would be improved down to where Sections 36 (T.40S.,R.3E.)and 1(T.41S.,R.3E) meet and closed to unauthorized vehicles between November 15 and April 1 of each year. Skookum Creek road past the common line of Section 36 (T.40S.,R.3E.)and Section 1(T.41S.,R.3E) would be close to unauthorized traffic throughout the year.
- Improve the Soda Mountain lookout road for extended season use and install a gate where spur road takes off to the lookout.
- Road 41-2E-9.0 (segments A&B) past the barricade in T.41S., R.2 E., Section 9, SW1/4NW1/4 would be closed and mechanically decommissioned.
- Lone Pine Ridge Road (40-3E-31) past the block in T.40S., R.3E., Section 31 would be closed and left to decommission naturally.
- The un-numbered road which crosses the Oregon-California border at the section line between sections 7 and 18, T.41S., R.4E. would be closed for use by unauthorized vehicles.
- The un-numbered road which crosses the Oregon-California border at the south section line of Section 13, T.41S., R.2E. would be closed and mechanically decommissioned.

Mechanized Recreation

All mechanized forms of recreation are restricted to designated roads which are open for public access. These roads are identified in the transportation plan (map 32). Included in this category are mechanized vehicles of all types including snowmobiles and mountain bikes. No mechanized vehicles are allowed off of designated roads. Designating roads specifically for non-motorized mechanized recreation could be considered in the future. In this alternative, Alternative C, all BLM-administered roads in the north zone (map 42) of the Monument would be designated for snowmobile use. This designation does not include roads that have been closed or decommissioned under this alternative.

Non-Mechanized Recreation

Under this alternative dispersed "leave no trace" camping would be allowed across the entire CSNM except for the Hyatt Lake Recreation Complex, the RNAs , and in structures at the former Box-O Ranch area. Camping within the Hyatt Lake Recreation Complex is restricted to designated sites. Organized groups that have existing permits would be allowed to camp outside of the Hyatt Lake designated group areas. These permits would only be renewed if the activities are found to be consistent with the objectives of the CSNM. No new applications for dispersed group camping would be accepted under this alternative. Group camping for administrative purposes would be allowed as long as the activity does not interfere with the protection of monument objects or resources. Camp fires would be allowed within the CSNM except within the RNAs. All camp fires would be consistent with State of Oregon regulations and adhere to the "leave no trace" camping objectives. Within the Hyatt Lake Recreation Complex, camp fires are only allowed in designated fire pits

Hunting and fishing regulations are set by the State of Oregon and this plan does not address those regulations.

The only existing hiking trail within the CSNM is the PCNST (and associated side trails). Under this alternative new trail construction or designation could occur but only within the designated primary recreation use zones (see map 42). Hiking is unrestricted in the Monument except within RNAs where is is restricted to existing roads/trails.

In order to protect the natural geologic features, technical rock climbing would not be allowed within the CSNM. Hang gliding and para-sailing/gliding would only be allowed in designated areas and by permit only. The designated area would be determined by the Monument staff through an analysis process after an application is received and the decision is made to permit the activity. Other activities not mentioned would be analyzed on a case-by-case basis.

Recreational Animal Stock Use

Under this alternative, recreational stock use would not be allowed in RNAs. Recreational animal stock use off road would be allowed in the remainder of the CSNM with the following restrictions:

- The total number of stock on overnight trips would be 4 animals/group.
- The total number of stock on day trips is restricted to 6 animals/group.
- These animals would not be allowed to overnight within 200 feet of any waters edge.
- No recreational stock use of any kind is allowed in the South Zone from November 15 to May 1.

Recreational animal stock use for commercial purposes would not be allowed anywhere within the CSNM under this alternative.

Visitor Facilities

This alternative allows for the improvement and alteration of existing facilities for use as part of the Monument's visitor services and interpretation program. The Hyatt Lake administration site may be improved (including signs and new entry) to serve as a visitor contact station. The existing Welcome Center/Ashland Ranger District office would still be utilized as an Interagency Welcome Center under this alternative. The BLM Medford District would remain a point of contact for visitor information and the CSNM headquarters. This alternative would allow for the development of facilities within the surrounding communities for use as potential visitor contact stations. Exact location of these facilities would be based on availability of infrastructure, environmental site constraints, economic viability, and potential funding.

This alternative provides for the maintenance of existing designated trailhead, parking, and toilet facilities as described under Alternative B plus designated parking areas at the:

- Pacific Crest National Scenic Trail (PCNST) and Pilot Rock Trail parking at end of 3.0 Road off Pilot Rock Rd.(40-2E-33): [T41S, R2E ,Section 3] Pilot Rock parking facility at rock quarry along the Pilot Rock Road (40-2E-33): [T41S, R2E, Section 3]

In addition, this alternative allows for the improvement and alteration of the existing designated sites that are also located within the primary recreation use zones (see map 42). Temporary toilets could be provided, as necessary, at existing designated trailhead and parking sites that are located within the primary recreation use zones. Construction of new permanent toilets would be considered only within the Hyatt Lake Recreation Complex. Parking off-road on BLM land would be permissible only at existing designated sites.

New interpretive sites and/or signs could be developed, as needed, in the primary recreation use zones within north management zone for resource protection, travel information, educational purposes and/or public safety. No new interpretive sites would be developed in the south management zone and new signs would be installed only for resource protection, travel information, and/or public safety.

Linear Rights-of-Way and Communication Sites

The Proclamation states: "The establishment of this monument is subject to valid existing rights." Valid Existing Rights include a variety of BLM authorizations such as right-of-way grants, leases, permits and reciprocal agreements. Private land owners within the Monument are assured access to their property as existing law requires the Bureau of Land Management to provide reasonable access to non-federally owned land that is surrounded by public land.

One objective is to continue to make BLM administered lands available for needed rights-of-way where consistent with local comprehensive plans, Oregon statewide planning goals and rules, and protection of Monument resources. Another objective is to ensure that all rights-of-way for hydroelectric developments are consistent with Northwest Power Planning Council guidance, which recommends prohibiting future hydroelectric development on certain rivers and streams with significant fisheries and wildlife values. Land use allocation direction pertaining to the CSNM are:

- Allocation of lands to existing rights-of-way corridors and communication sites would continue.

- Subject to all VERs, with the exception of buried lines in rights-of-way of existing roads, avoid new rights-of-way in the CSNM. Rights-of-way may be granted when no feasible alternate route or designated rights-of-way corridor is available but every measure would be taken to minimize the negative affects on Monument resources.

- Rights-of-way must avoid adverse effects that retard or prevent attainment of the Monument Aquatic Conservation Strategy and riparian reserves objectives. Where legally possible adjust existing rights-of-way to eliminate adverse effects that retard or prevent the attainment of the Monument Aquatic Conservation Strategy and riparian reserves objectives. If adjustments are not effective and where legally possible, eliminate the activity.

Existing communication site authorizations on Soda Mountain and Chestnut Mountain would continue. No new communication sites would be developed in the CSNM. There would be no new facilities built at the existing communication sites and efforts to mitigate visual effects of the existing facilities would be undertaken. The Soda Mountain communication site access road would be improved to reduce erosion, maintained to BLM standards and gated.

Alternative C would continue current levels of maintenance, access and other established uses consistent with previously identified objectives and VERs.

ALTERNATIVE D

Alternative D promotes aggressive management for protection, maintenance and restoration of Monument resources through the use of all management tools available. Recreation and visitor use would be accommodated to the fullest extent possible while protecting Monument resources. The transportation system would be managed to accommodate and promote visitor use, where feasible, and safety while aggressively closing and decommissioning roads (both mechanical and natural) in order to protect and restore Monument resources.

Vegetation Management in the Diversity Emphasis Area

In comparison to Alternatives B and C, Alternative D incorporates all tools available for an aggressive approach to attainment of protection, maintenance, restoration and enhancement of plant communities within the Diversity Emphasis Area. This alternative facilitates management intervention in areas where tools defined by Alternative C are ineffective or impossible to apply because of limitations in topography (e.g., steep slope) and location (e.g., adjacent to private land or midslope) or current condition (e.g., high fuel-loading). Use of tractor mounted mechanical contrivances would allow treatment over a larger area of the Monument. Management objectives for the plant communities are the same as Alternative C listed in table 3-2.

List of tools/management actions available to meet defined management objectives

All management tools are available in Alternative D. This includes herbicide application, manual weeding, plowing/discing, slashbuster, mowing, bio-control, prescribed fire, fence construction, mechanical chipping, manual thinning, mechanical thinning, native plant establishment, weed-eater, helicopters, chainsaws, handheld auger, and tractor driven auger.

Vegetation Management Strategy

The vegetation management strategy for Alternative D is the same as Alternative C.

Vegetation Management in the Old-Growth Emphasis Area

Alternative D would incorporate the objectives of Alternative C with some additional measures to protect and/or enhance existing late-successional and old-growth habitat (habitats 1&2). In addition to vegetation treatments proposed in Alternative C, measures would be taken to protect and/or enhance existing late-successional and old-growth habitat by including commercial thinning (along with non-commercial thinning) of habitat types 1 and 2 with high fuel hazards and treating the activity fuels. This could occur on the 1,770 acres of habitat type 1 and 2 previously identified in Alternative C. These treatments would open up the canopy, decrease vegetation competition, increase tree vigor and reduce fuel ladders. Commercial thinning of this habitat would be part of a science-based ecological restoration project aimed at meeting protection and old-growth enhancement objectives.

In addition to fuel reduction measures listed in Alternative C, all habitat type 5 stands within 1/4 mile of existing late-successional and old-growth habitat that have moderate fuel hazard would be treated to reduce fuel loading (see map 44). This treatment would occur on up to approximately 4,400 acres. Thinning of existing vegetation, both commercially and non-commercially, could occur before fuel reduction treatments occur if necessary. Commercial thinning would be part of a science-based ecological restoration project aimed at meeting late-successional and old-growth habitat protection and enhancement objectives. Table 3-4 summarizes potential treatments that would occur in the Monument over the next ten years to protect late-successional and old-growth habitat.

The prioritized criteria used to identify treatment areas under Alternative D to accomplish Old-Growth Emphasis Area goals would be the same as Alternative C (items 1-6) plus those listed below.

7) Treatment of existing late-successional and old-growth habitat that have high fuel hazard by commercial thinning habitat types 1 and 2 and treating the activity fuels.

8) Treatment of all forest stands in habitat type 5 within 1/4 mile of existing late-successional and old-growth habitat that have moderate fuel hazard to reduce fuel loading.

9) Effectiveness monitoring of treated stands

Table 3-4. Summary of Potential Treatments for Late-Successional and Old-Growth Protection in Alternative D

Habitat Type	Possible Treatment in the next decade	Potential Treated Acres	Percent of Habitat Potentially Treated
1 & 2	• Reduction of Fuel Component • Possible Commercial & Non-Commercial thinning	1,770	15
3	• Treat all habitat with moderate & high fuel hazard within ¼ mile of habitat 1&2 for fuel reduction • Commercial & Non-Commercial thinning could occur prior to fuel treatment	2,346	62
4	• Treat all habitat with high fuel hazard within ¼ mile of habitat 1&2 for fuel reduction	2,614	14
5	• Treat all habitat with moderate and high fuel hazard within ¼ mile of habitat 1&2 for fuel reduction • Possible Commercial & Non-Commercial thinning	7,239	84
6	• Treat all habitat with high fuel hazard within ¼ mile of habitat 1&2 for fuel reduction	157	14
Total of CSNM outside of WSA & RNAs		**14,126**	**32**

Special Forest Products

No commercial collection of any Special Forest Products would be allowed within the CSNM. There would be no collection of plant material in the CSNM except fungi/mushrooms for personal use. Special use permits would be required for traditional native American gathering or approved administrative use such as research projects. During thinning and fuel management activities, in areas where adequate levels of coarse woody debris exist, firewood would be moved to slash decks. Firewood would be made available from these slash decks for personal use with a permit. Permits for the collection of rock/gems and petrified wood for personal use would be issued in pre-designated areas as long as the collection does not interfere with the protection of Monument resources.

Transportation System

Under the Alternative D, the transportation system would be managed as shown on map 33. The objectives are to maintain the minimal transportation system necessary to facilitate meeting the overall goal of protection, maintenance, restoration and enhancement of Monument resources. Problems associated with high road density would be corrected by emphasizing the reduction of roads where those situations occur.

Management directions that pertain to Alternative D are the same as describe in Alternative C. In this aternative, vehicles would be authorized to leave the designated road surface for parking and.or camping but must stay within 150 feet of the road prism. Vehicles must not cause environmental damage, create new roads/trails, or leave the road to bypass road closure barriers. Vehicles may exceed the 150 feet limitation on hardened, traditional surfaces to access camping areas.

Transportation Management Objectives for alternative D are shown on map 33. Major roads of concern are listed below with recommended treatments:

- Schoheim road (41-2E-10.1); most of the road would be closed and mechanically decommissioned, the eastern portion would be closed for use by unauthorized vehicles except between the southwest section line of T.40S.,R.4E.,Sec.4 and the Copco road where it provides access to private property.
- Pilot Rock Road (41-2E-3.0) past the point where it crosses the Pacific Crest National Scenic Trail would be closed and mechanically decommissioned.
- Improve the Pilot Rock road (BLM #40-2E-33&41-2E-3.0 before the PCNST) to allow all season use. This may include surface rock or surface rock plus oil.
- Randcore Pass Road (40-4E-19.2) past the junction with road 40-4E-31.0 would be closed and mechanically decommissioned.
- Skookum Creek road (40-2E-28 and 40-3E-27.2) past the junction with road 40-3E-27.1 would be improved and left open to the public throughout the year down to where Section 36 (T.40S.,R.3E.) and Section 1(T.41S.,R.3E) meet. Skookum Creek road past where Section 36 (T.40S.,R.3E.) and Section 1(T.41S.,R.3E) meet would be closed to unauthorized use.
- Improve spur road in Section 21 (T.40S.,R.3E.) that ties back into the BLM 39-3E-32.3 road.
- Road 41-3E-9.0 past the barricade in T41S, R2 E, Section 9, SW1/4NW1/4 would be closed and mechanically decommissioned.
- Lone Pine Ridge Road (40-3E-31) past the block in T40S, R3E Section 31 would be closed and mechanically decommissioned.
- The un-numbered road which crosses the Oregon-California border at the section line between sections 7 and 18, T41S, R4E would be closed for use by unauthorized vehicles.
- The un-numbered road which crosses the Oregon-California border at the south section line of Section 13, T41S, R2E would be closed for use by unauthorized vehicles.
- Explore acquiring access to public use.

Mechanized Recreation

All mechanized forms of recreation are restricted to designated roads which are open for public access. These roads are identified in the transportation plan. Included in this category are motorized vehicles of all types including snowmobiles and mountain bikes. No cross country travel by any of these vehicles is allowed in CSNM. Designating existing roads or constructing new roads specifically for non-motorized mechanized recreation could be considered in the future. Under this alternative, Alternative D, all BLM-administered roads in the Monument would be designated for use by snowmobiles. This designation does not include roads that have been closed or decommissioned under this alternative such as the Schoheim road (41-2E-10.1).

Non-Mechanized Recreation

Under this alternative, dispersed "leave no trace" camping would be allowed across the entire Monument with the exception of the Hyatt Lake Recreational Complex, RNAs, and in the structures of the former Box-O Ranch area. Camping in the Hyatt Lake Recreation complex would be confined to designated camp sites. Organized groups with existing permits would be allowed to continue their event with no guarantee of renewal. Renewal would only be approved if the activity is consistent with the protection of CSNM objects. Groups of 12 or more persons planning to camp outside of the Hyatt Lake Recreation Complex would be required to obtain a permit. A limited number of new group camping applications would be accepted for analysis and possible approval. Group camping for administrative purposes would be allowed throughout the monument as long as it does not conflict with resource and monument object protection. Campfires would be allowed within the CSNM except in RNAs, where they are prohibited and in the Hyatt Lake Complex where they must be in designated fire pits.

Hunting and fishing regulations are set by the State of Oregon and this plan does not address those regulations.

The PCNST is the only hiking trail within the CSNM. Under this alternative, new trail construction or designation could be approved if analysis shows it is compatible with the objectives of the CSNM. No trail construction or designation would occur within the RNAs or WSA. Hiking is unrestricted in the Monument except within RNAs where is is restricted to existing roads/trails.

In order to protect the natural geologic features, technical rock climbing would only be allowed on Pilot Rock. The use of power augers for the placement of permanent protective devices would be prohibited. All protection on the rock used in technical climbing would be removed after completion of the climb.

Hang gliding or para-sailing/gliding would be allowed throughout the Monument with the exception of the WSA and the RNAs. Other forms of recreation would be analyzed by Monument staff prior to permitting the activity to occur.

Recreational Animal Stock Use

Recreational stock use would be allowed throughout the CSNM except for the RNAs. The maximum number of animals allowed on day trips would be 12/group and the maximum number of animals allowed on overnight trips would be 8/group. Animals that reside overnight must be at least 100 feet from any waters edge. Animal stock would consume only weed-free feed 24 hours prior to entering the Monument. Feed for stock must be brought in and only certified weed free feed may be used.

Commercial recreational stock use would be allowed throughout the CSNM except in the RNAs or WSA. Up to three Special Recreation Permits (SRPs), would be issued yearly. Special stipulations would be attached to ensure protection of Monument resources. Permittees would only be allowed to use designated routes and campsites. The total number of stock allowed for day trips would be 12, and the maximum number on overnight trips would be 8. Commercial stock must overnight at least 200 feet from any waters edge. Animal stock would consume only weed-free feed 24 hours prior to entering the Monument. All feed must be brought in for the animals and only certified weed free feed can be used. Commercial stock activities are not allowed in the South Management Zone from November 15 to May 1.

Recreational animal sledding would be allowed on designated roads/trails in the entire Monument except RNAs Up to three Special Recreation Permits for anumal sledding would be issued in the northern management zone.

Visitor Facilities

This alternative allows for the same facility parameters as Alternative B, with the additional allowance for the construction of a new facility within the Monument boundary.

This alternative would provide for the continued maintenance of existing designated trailhead, parking, and toilets as described in Alternative C. Improvements and alterations of existing designated trailhead and parking sites would be allowed throughout the Monument. Similarly, construction of new trailhead and parking facilities would be considered on federal land throughout the Monument. Temporary toilets could be located as necessary on BLM land throughout the Monument. Construction of new permanent toilets would be considered on BLM land within the primary recreation use zones. Drinking water sources and new permanent toilets could be developed at sites within this primary recreation use zone (see map 42).

This alternative allows for the continued use and maintenance of all existing interpretive sites and signs on BLM land within the monument. In addition, alterations and improvements of existing sites and signs could occur throughout the Monument as necessary. New sites and signs could be developed throughout the entire Monument.

Management of Linear Rights-of-Way and Communication Sites

The management of linear rights-of-way would be the same as described in Alternative C. Under this alternative, there would be no additional communication sites constructed in the Monument but new facilities would be considered at existing communication sites. Efforts to mitigate visual impacts of any authorized new facility would be implemented. In addition, if funding is available, an in-depth analysis of the existing situation would be undertaken in order to develop a site specific management plan which addresses site efficiency and visual resources. The plan would also address new technology and the possibility of managing the communication site(s) through a professional site manager in an effort to coordinate users in meeting management objectives.

Management Common To All Alternatives

Monument Aquatic Conservation Strategy

All management actions/treatments throughout the Monument would be consistent with the Monument Aquatic Conservation Strategy listed in Appendix BB. This strategy identifies protection required for all water bodies including permanently-flowing and intermittent streams, lakes, ponds (natural and constructed), springs, and wetlands. Riparian Reserves are the primary management tool for protection of water bodies and their associated riparian vegetation. In addition, Riparian Reserves are used to protect unstable and potentially unstable areas within the Monument.

Restoration and enhancement activities that benefit aquatic habitat and water quality may be conducted throughout the CSNM These activities may include, but would not be limited to planting vegetation in riparian areas, stabilizing stream banks, placing instream habitat structures (e.g. logs, boulders, etc.), fencing springs and wetlands, and upgrading or decommissioning roads. In addition, partnerships with private landowners, watershed councils, state and other federal agencies would be pursued to remove or improve fish passage barriers such as diversion dams. Streams with the highest priority for aquatic habitat restoration and enhancement efforts are Jenny and Keene Creeks. The highest priority for spring and wetland restoration would be assigned to those that contain endemic mollusks. The highest priority for water quality restoration and enhancement projects would be on the water quality limited streams listed in Table 2-9. Environment assessments will be prepared on a project specific basis to evaluate the potential impacts of any proposed ground-disturbing activities.

Management of Soda Mountain Wilderness Study Area (WSA)

In 1991, the Secretary of the Interior recommended to the President of the United States, who subsequently recommended to Congress, that certain areas currently designated as WSAs be officially designated as wilderness and that certain other areas designated as WSAs be deleted from wilderness consideration. The recommendation for the Soda Mountain WSA included 5,867 acres suitable for wilderness designation and 28 acres not recommended for wilderness designation. Since the original proposal, advanced mapping techniques (Geographical Information System) now show the Soda Mountain WSA at 6,447 acres. The WSA boundary has not changed from the original designation. Until Congress acts on the President's recommendation for the Soda Mountain Wilderness Study Area, it is to be managed under BLM's *Interim Management Policy For Lands Under Wilderness Review*, H-8550-1. The Interim Management Policy manual describes the policies under which the Bureau of Land Management will manage lands under wilderness review until Congress either designates these lands as wilderness or releases them for other purposes.

The Interim Management Policy applies only during the time a WSA is under wilderness review and until Congress acts on it, or where applicable, by a final decision by the BLM. After Congress acts on the President's recommendations for each WSA, a different policy will apply, depending on whether or not Congress designates the area as wilderness. Areas designated as wilderness will be managed under BLM manual 8560-Management of Designated Wilderness Areas and under the regulations at 43 CFR 6300. Areas released from wilderness study will no longer be subject to the Interim Management Policy, and will be managed consistent with surrounding contiguous landscape of the CSNM.

In the Soda Mountain Wilderness Study Area, necessary actions designed to protect the physical, biological, and cultural resources, as well as the quality of the wilderness experience will be accomplished using methods and equipment that have the least impact on the quality of an individual or group's wilderness experience, as well as the physical, biological, and cultural resources within the WSA. The minimum tool, equipment, or structure necessary to successfully, safely, and economically accomplish the objective will be used. The chosen tool, equipment, or structure will be the one that least degrades wilderness values temporarily or permanently.

Management of Research Natural Areas

The management of each Research Natural Area (RNA) is common to all alternatives as a specific management plan based on the criteria of the Oregon Natural Heritage Program was written. The Oregon Gulch RNA Management Plan is Appendix DD and the Scotch Creek RNA Management Plan is Appendix EE.

CSNM Property Boundary and Ownership

The Cascade-Siskiyou National Monument designation applies only to federally managed land. The external boundary depicted on the CSNM Analysis Area map (map 1) is for planning purposes only. Privately owned property within this outer boundary is not encumbered by, or in any way a part of the CSNM designation. In the event additional property is acquired within the CSNM boundary, it will become part of and managed in accordance with the Monument plan to further the values for which it was acquired.

Land Tenure Adjustments

CSNM Proclamation permits acquisition of private property to further protect the ecological values for which the Monument was designated. However, any acquisitions would occur with voluntary participants only, and be conducted in accordance with existing laws and regulation pertaining to federal land exchanges and acquisition of non-federal property. The Proclamation withdraws public lands from selection, sale, leasing or other disposition under the Public Land Laws except by exchange for the purposes of furthering the values for which the Monument was designated. Land acquisitions, through purchase or exchange, would be considered on a case by case basis where the resource values to be acquired would enhance or protect the objects for which the CSNM was designated. The exchange of public lands within the CSNM for private lands that would better protect and/or enhance the purposes for which the Monument was designated is permitted. Lands may come under BLM administration within the Monument boundary established in the Presidential Proclamation (map 1) after completion of the Cascade-Siskiyou National Monument Resource Management Plan/ Record of Decision through exchange, donation, purchase, revocation of withdrawals of other Federal agencies, or relinquishment of Recreation and Public Purpose Act leases. Newly acquired or administered lands or interest in lands would be managed for their highest potential or for the purposes for which they are acquired. Lands acquired with no identified special values or management goals would be managed in the same manner as surrounding or compatible Monument land.

Noxious Weed Control and Management

The control and management of noxious weeds is a priority across the CSNM and will conform to the Medford District's Integrated Weed Management Plan and Environmental Assessment (EA) #OR-110-98-14 (Appendix S), tiered to the *Northwest Area Noxious Weed Control Program Environmental Impact Statement* prepared 12-85 and amended 3-87. The weed management plan for the CSNM is listed in Appendix GG.

Wildfire Suppression Policy

Due to ownership patterns and logistic constraints, the use of wildfire to meet resource objectives is not possible. The Bureau of Land Management has a master cooperative fire protection agreement with the Oregon Department of Forestry (ODF). This agreement delegates the responsibility of fire protection of all lands within the CSNM to the Oregon Department of Forestry. This contract directs ODF to take immediate action to control and suppress all wildfires. Their primary objective is to minimize total acres burned while providing for fire fighter safety. Although suppression tactics and practices may vary among alternatives, initial response and escape fire policy will be governed by the Bureau of Land Management's, *Master Cooperative Fire Protection Agreement* (#HA-A98-2A00, 10-14-98) with ODF. Special areas within the CSNM that require special suppression methods designed to minimize damage to unique habitat and resources have been designated and are listed in Appendix L.

Air Quality Management

The operational guidance for the Oregon Smoke Management Program is managed by the Oregon [illegible]ster. The policy of the State Forester is to:

- Regulate prescribed burning operations on forest land.
- Achieve strict compliance with the smoke management plan.
- Minimize emissions from prescribed burning.

For the purpose of maintaining air quality, the State Forester and the Department of Environmental Quality shall approve a Oregon Smoke Management Plan for the purpose of managing smoke in areas they designate. The authority for the State administration is ORS 477.513(3)(a).

ORS468A.005 through 468A.085 provides the authority to DEQ to establish air quality standards including emission standards for the entire State or an area of the State. Under this authority the State Forester coordinates the administration and operation of the plan. The State Forester also issues additional restrictions on prescribed burning in situations where air quality of the entire State or part thereof is, or would likely become adversely affected by smoke.

In compliance with the Oregon Smoke Management Plan, prescribed burning activities on the Medford District require pre-burn registration of all prescribed burn locations with the Oregon State Forester. Registration includes specific location, size of burn, topographic and fuel characteristics. Advisories or restrictions are received from the State Forester on a daily basis concerning smoke management and air quality conditions.

The amount of smoke that constitutes a nuisance is not often defined but generally includes a property use or behavior that significantly impairs the use of other property due to some health, safety or economic consideration. The specific concentration or duration of smoke that constitutes a nuisance is subjective and site specific.

In order to avoid creating or continuing nuisance situations, the BLM has implemented smoke management guidelines. The guidelines used for each fire include:

- Identify critical smoke sensitive targets during the planning stage that may be affected by smoke.

- Prescribe weather and burning conditions that would direct smoke away from critical sensitive targets, such as wind direction and speed. Others include burning conditions that maximize the amount of smoke lifted and weather conditions that maximize dispersal (i.e. mixing height, transport wind speed and probability of air mass stagnation).

- On the afternoon prior to burning, obtain a weather forecast and smoke management forecast to make sure the prescribed weather and burning conditions will be met.

- On the morning of the burn, check to see if the weather and smoke management forecasts are favorable. If so, initiate any planned mitigation measures, light the fire and begin monitoring fire/smoke behavior for unanticipated situations. Be prepared to cease ignition and /or begin suppression if unanticipated situations cannot be controlled or mitigated. Also, be prepared to patrol smoke sensitive roadways through the night if the fire is still producing significant smoke at dusk.

- Whenever possible, burn when large fuel (3"+ in diameter) and duff moisture levels are high to minimize emissions. This may be best accomplished by burning under spring-like conditions. Utilize firewood sales to reduce fuel loads.

- Whenever possible, pile fuels prior to burning. Piled fuels result in fewer emissions per ton of fuel consumed and have greater seasonal flexibility.

- Whenever possible, burn only fuel concentrations rather than the entire area.

- Whenever possible burn during periods of atmospheric instability for better smoke dispersal.

Archaeological Site Protection

Archaeological sites within the CSNM would be protected in accordance with applicable laws and regulations. The *National Environmental Policy Act* and *Federal Land Policy and Management Act*, direct federal agencies to preserve important cultural and historical sites. In addition, the *National Historic Preservation Act* (NHPA) requires agencies to consider the effects of their actions on significant historic sites. Section 106 of the NHPA provides a process for identifying, evaluating, and assessing effects of federal actions on cultural resources. The Programmatic agreement between the BLM, the Advisory Council on Historic Preservation, and National Conference of State Historic Preservation Officers, and a Protocol for Managing Cultural Resources established by the Oregon State Historic Preservation Office and the BLM Oregon/Washington State Office implements this act.

Special Use Activities

Special Areas are areas officially designated by Presidential proclamation, statute or Secretarial order including: components of the National Trails System, the National Wild and Scenic Rivers System; National Conservation Areas, National Monuments and Recreation areas; the National Wilderness System; an area covered by joint agreement between the BLM and a State government as provided for in Title II of the Sikes Act; or any area where the authorized officer determines that the resources require special management and control measures for their protection and a permit system for individual use would achieve management objectives. Organized Group Activity and Event Use permits are for noncommercial and noncompetitive group activities and recreation events. Special Area use permits may be required for individual (private, noncommercial) recreation use in the CSNM. The Monument manager would determine when a permit is required based on resource concerns, user conflicts and/or the need for monitoring. Some restrictions may be applied to the number and type of permits issued based on restrictions identified in the proposed alternatives.

The issuance of a Special Recreation Permit (SRP) is a discretionary action. Applications for uses requiring an SRP may be denied based upon factors such as a moratorium issued as part of planning decisions; the results of an environmental analysis; other potential impacts to resource values; a use allocation system; public health and safety; the applicant's past performance; or the inability of the managing office to manage or monitor the proposed use. Before issuing a Special Recreation Permit for an activity or group event, a determination is made that the requested use is primarily recreational. If not, it may be more appropriate to authorize the use as a land use permit under FLPMA (see **General Land Use Authorization Policy** section).

General Land Use Authorization Policy

BLM'S authority for issuing land use authorizations on the Public Lands was established by Congressional action in 1976. That was the year Congress passed Public Law 94-579, known as *Federal Land Policy and Management Act* (FLPMA). With the passage of FLPMA, the BLM was given broad discretion to manage the public lands for proposed uses utilizing a variety of "tools" to achieve this end. Under Title III, Section 302 (b) of FLPMA it states:

> "In managing the public lands, the Secretary shall, subject to this Act and other applicable law and under such terms and conditions as are consistent with such law, regulate, through easements, permits, leases, licenses, published rules, or other instruments as the Secretary deems appropriate, the use, occupancy, and development of the public lands..."

Paint Ball Gun Recreation

The discharging of paint ball guns will not be permitted within or into the CSNM.

Hyatt Lake Recreation Complex Management

The Hyatt Lake Recreation Complex is 474 acres located in the northwest corner of the Monument (map 2). This high-use recreation area has developed recreation facilities that require substantial investment and management. Management objectives within the Hyatt Lake Recreation Complex are to provide for safe and enjoyable recreational opportunities consistent with the protection of Monument objects. The vegetation in the Hyatt Lake Recreation Complex will be managed consistent with the appropriate vegetation emphasis area. The Hyatt Lake Recreation Complex (HLRC) facilities will be managed to accommodate existing visitor uses and activities in accordance with the Hyatt Lake Recreation Complex Management Plan (Appendix HH). Future expansion within the Hyatt Lake Recreation Complex will be evaluated and undertaken as needs are identified.

Northwest Forest Plan

Although the CSNM designation supercedes all prior designations, the Monument will continue to contribute toward the overall Northwest Forest Plan goal of maintaining, protecting and enhancing late-successional and old-growth habitats in accordance with the *Final Supplemental Environmental Impact Statement on the Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl* (USDA/USDI, 1994).

Snags and Coarse Woody Debris

All management activities within the Old-Growth Emphasis Area will adhere to the Snags and Coarse Woody Debris standards and guidelines listed in Appendix JJ.

Best Management Practices

Best Management Practices (BMPs) are required by the Federal Clean Water Act (as amended by the Water Quality Act of 1987) to reduce non-point source pollution to the maximum extent practicable. BMPs are considered the primary mechanisms to achieve Oregon water quality standards. All management activities and practices within the CSNM will be consistent with the Best Management Practices described in Appendix AA

Management of Fish and Wildlife by the State of Oregon

The Oregon Department of Fish and Wildlife (ODFW), the U.S. Fish and Wildlife Service and the National Marine Fisheries Service have responsibility for the management of all fish and wildlife populations (setting desired population levels, protecting special species, setting hunting/trapping laws and harvest limits, licenses and fees, etc.) throughout Oregon. Federal agencies work cooperatively with state agencies to ensure that federal habitat management is consistent with ODFW fish and wildlife population management goals. However, ODFW will be responsible for the management of fish and wildlife within the CSNM.

Pacific Crest National Scenic Trail

The Pacific Crest National Scenic Trail would be managed according to the existing comprehensive management plan (USDA 1982) with a 100 foot no-cut vegetation buffer on either side of the trail. Exceptions to the buffer restriction are for trail maintenance and safety.

Management of Survey & Manage/ Special Status Species

Special Status Species are plant and animal species which are proposed for listing, officially listed (T/E) or candidates for listing as threatened or endangered by the Secretary of the Interior under the provisions of the *Endangered Species Act* (ESA); those listed or proposed for listing by the State of Oregon, and those designated by the BLM State Director as sensitive. Special Status Species will be managed in accordance with the ESA, Bureau standards/policy and guidelines listed in Appendix Z.

In order to reduce adverse effects to rare plant, surveys and measures to maintain or enhance viable populations of rare plants will be accomplished on a project basis following Bureau policy, guidelines, and measures outlined in Appendix Z during the implementation. Surveys and consultation with the U.S. Fish and Wildlife Service on projects potentially affecting the endangered Gentner's fritillary (*Fritillaria gentneri*) is required.

Visual Resource Management

The existing Visual Resource Management (VRM) designations of class III and IV within the Monument do not coincide with the ecological goals established in the Presidential Proclamation nor do they reflect the national scope of public sensitivity which has occurred as a result of the establishment of the CSNM. Under all alternatives, CSNM land in the north management zone (see map 42) will be managed as VRM Class II and the south management zone will be managed as VRM Class I. The policy justification for managing to a VRM class higher than currently allocated within the BLM Medford Resource Management Plan, is found within the VRM Manual.

Class I is assigned to those areas where a management decision has been made previously to maintain a natural landscape. This includes areas such as national wilderness areas, the wild section of national wild and scenic rivers, and other congressionally and administratively designated areas where decisions have been made to preserve a natural landscape (VRM Manual 8410-1, Section V, pg. 5)

The objective of Class II is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

The long-term management objectives in the CSNM focus on the preservation of the natural landscape. Past management activities, both federal and non-federal, in the northern management zone have pre-empted the existence of a natural landscape. Although the long-term goal is to restore a natural landscape, future management activities to meet objectives of the Old-Growth Emphasis Area (i.e., vegetation manipulation, prescribed burning) may be in conflict in the short-term. Therefore, the CSNM landscape within the north management zone will be managed to meet VRM Class II. Anticipated land management activities for vegetation manipulation, road / transportation and other authorized uses (i.e., linear power lines or communication facilities) will be localized and have short-term effects on visual resources from critical viewpoints and, with proper mitigation, are considered consistent with the long-term VRM direction. The objective is to promote a sustainable landscape character which reflects the dynamic, natural patterns of the regional ecosystems, while allowing for culturally valued modifications which blend with these patterns. The CSNM southern management zone exhibits a natural landscape which should be preserved and will be managed as a VRM Class I. The exception to the VRM Class I would be the existing right-of-way for the power transmission line in the southern management zone which would be managed VRM Class II.

Off-Highway Vehicular (OHV) Travel

For the purposes of protecting the objects and values for which the CSNM was designated, all mechanized modes of surface travel, including but not limited to, OHVs, motorcycles, all terrain vehicles, snowmobiles, bicycles and tractors shall be confined to the surface of designated open roads except for emergency, administrative and other authorized use.

Livestock Grazing

Livestock grazing will continue, in the short-term, consistent with management established prior to the establishment of the CSNM. The Presidential Proclamation has directed the Secretary of the Interior (through the BLM) to study the impacts of livestock grazing on the objects of biological interest with specific attention to sustaining the natural ecosystem dynamics. This shall be accomplished through:

- Ongoing and future research and monitoring.
- Reviews of existing published literature where inferences can be drawn from relevant, comparable ecological relationships.
- Evaluations of existing data on historic trends relative to the CSNM objects of biological interest.

Numerous research and monitoring efforts have been developed as the Draft Study of Livestock Impacts on the Objects of Biological Interest in the Cascade-Siskiyou National Monument (USDI 2001). Additional research and monitoring plans may be developed as identified. The draft study plan (USDI 2001) of research and monitoring pertaining to livestock grazing activities is available for public review and will be peer reviewed before being finalized. The impacts of livestock grazing will be assessed upon completion of the study. Subsequent evaluations will be conducted, as determined by the monitoring and research study plans.

Impacts to be studied include the consequences of grazing and trampling of vegetation by livestock, and the affects of facilities and operational activities required to sustain and manage livestock operations. Livestock grazing practices within the CSNM shall be deemed incompatible if :

- found to be substantially responsible for the introduction and/or spread of noxious weeds, undesirable non-native species and vegetation.

or

- determined to reduce or impede the recovery of rare, threatened, endangered, special status or native species populations.

or

- they do not maintain or restore conditions consistent with the attainment of the Monument Aquatic Conservation Strategy, Clean Water Act and Grazing EIS objectives, or do not comply with other applicable laws and regulations.

or

- determined to be a factor responsible for, or contributing to adverse impacts to important wildlife habitats including black-tailed deer winter range, native ground nesting birds, and rare or special status animal species.

or

- found to be deleteriously impacting springs, seeps and wetlands or damaging to aquatic organisms including sensitive aquatic mollusks and anadromous fish species.

or

- determined to be impacting archaeological resources or sites.

or

- determined to be responsible for undesirable changes in vegetation community composition and structure, or maintenance of the existing undesirable annual/perennial grass ratios.

The assessment of compatibility will be conducted by an interdisciplinary team of scientists comprised principally of fishery/aquatic biologists, wildlife biologists, rangeland ecologists, soil scientists and botanists. This interdisciplinary team will evaluate the impacts and/or usefulness of livestock grazing and provide recommendations on its compatibility to the Monument manager. Where/when deleterious impacts are identified within the CSNM, livestock management will be modified, reduced or eliminated. Continued livestock grazing shall not be authorized where identified as incompatible with the values for which the CSNM was designated. If livestock grazing is modified, reduced, eliminated or voluntarily relinquished, the resultant available vegetation/forage (AUMs) shall be reapportioned to benefit natural ecological processes.

Ground disturbing activities and the construction of new livestock facilities, including watering developments, corrals and chutes will not be authorized unless the grazing assessments conclude that they are necessary to protect or enhance the CSNM's objects of value. The construction of new fences shall only be authorized where required to protect ecological resources, and must comply with visual resource management guidelines. Existing livestock facilities may be maintained. The use of horses in livestock operations to control, disperse or manage grazing operations is considered an administrative use and will be allowed. The use of roads for livestock operations shall be limited to designated open roads and be consistent with the CSNM transportation management plan, except where/when otherwise authorized for administrative purposes by the Monument Manager.

Authorized Uses

All prohibited uses within the CSNM may be authorized for emergency, research, or administrative purposes. Authorized uses must not conflict with the protection of CSNM objects or resources. Vending within the Monument would be occasional, infrequent, and allowed by permit on a case-by-case basis following criteria that would protect Monument resources.

Hazards to Facility, Visitor and Public Safety

Removal of trees from within the Monument may take place only if clearly needed for ecological restoration and maintenance or public safety. The felling of trees that have commercial value may occur where select trees endanger facilities, visitor or public safety. Such situations are anticipated along roads, utility right-of-ways, trails, property lines, parking areas, and/or campgrounds and high visitor use areas within the Hyatt Lake Recreation Complex. These "safety" trees may be sold commercially only after it has be determined that they are not needed for riparian enhancement, coarse woody debris, or other resource value within the Monument.

Management of Visitor Facilities

All facilities, existing, newly acquired, jointly operated, or newly constructed, will comply with current legislation regarding accessibility [The Americans with Disabilities Act of 1990 (ADA), The Rehabilitation Act of 1973, and The Architectural Barriers Act of1968]. In addition, any new construction or alteration of existing facilities (including trails) would comply with state and local codes as well as impending federal legislation regarding the accessibility of the outdoor recreation environment. All existing and new facilities would be maintained, designed, and constructed according to Bureau standards. The above mentioned Acts do not pertain to roads and does not restrict or prevent the closing of roads for resource protection or other administrative purposes.

Public Outreach/Education

The overall goal for the public outreach and education in the CSNM is to enhance protection of the Monument's values and resources through increased awareness and appreciation. Public outreach and education for the CSNM would focus on adjacent landowners, local communities, and Monument visitors. The level of public outreach and education for the CSNM would correlate with the types of BLM management activities and the amount of visitor use in the Monument.

Adjacent Landowners and Local Communities

The checkerboard nature of land ownership within and adjacent to CSNM boundaries necessitates a commitment by BLM to establish communication and cooperation with adjacent landowners and local communities. The BLM would engage in public outreach activities designed to keep adjacent landowners and local communities informed of new developments or activities related to the CSNM.

Some on-the-ground management activities in the CSNM may be visible to the surrounding community and to Monument visitors. Public outreach would be designed to inform and educate the public about the goals, objectives and operation of different management activities as needed.

The BLM would strive to build relationships with the surrounding community through numerous approaches including partnerships and collaborative projects. When possible, the BLM would use existing community resources for the development of outreach or educational materials. The BLM could engage the surrounding communities in efforts to protect, enhance, and restore the resources of the CSNM through hands-on stewardship such as monitoring, restoration projects and scientific research.

In many cases, management activities designed to protect and restore Monument resources may be similar to the management objectives of adjacent landowners. The BLM would identify and use common land management goals as a basis for developing voluntary collaborative projects with adjacent landowners of the CSNM. These projects would be designed to promote the protection, restoration and enhancement of resources in the Monument and on adjacent non-federal land. For example, the long-term effectiveness of noxious weed control efforts in the Monument would increase if the BLM and adjacent landowners worked together on this problem. The reduction of fire hazard in the Monument and on adjacent non-federal lands is another example of a common goal. The BLM would keep the surrounding community informed of management activities in the Monument. When possible, the BLM may assist in providing technical or informational support to adjacent landowners wishing to engage in similar activities on non-federal land.

Visitor Education

Public outreach and education would be designed to promote protection and understanding of the CSNM. The amount of public outreach and education provided for visitors would be contingent on the level and types of activities taking place in the Monument. Visitor outreach and education would follow any restrictions on signing, interpretive exhibits, displays or facilities determined in this Plan.

Public outreach and education for all Monument visitors would emphasize resource protection and visitor safety by meeting the following objectives:

- Provide the public with accurate information on visitation, use and recreation in the CSNM.

- Identify areas of high visitor use, or areas with particularly fragile resources and take necessary steps to prevent resource damage.

- Educate visitors on how best to limit impacts to Monument resources using "Leave No Trace" principles.

- Target different types of recreation (i.e. equestrians, backpackers, snowmobilers etc.) with specific messages on how those user groups can prevent resource damage.

- Clarify visitor expectations and the Monument's mission with relation to visitor experiences on other public lands. Educate the public about the vision and mission of the National Landscape Conservation System (NLCS) and the CSNM.

- Provide information on how historical and current human uses within the Monument and on adjacent land have shaped the character of the Monument.

- Emphasize the need for visitors to be aware of and respect the private property adjacent to Monument lands.

- Increase appreciation of and respect for Monument resources through interpretation.

Issues and Actions Considered But Eliminated From Analysis

Expansion of the Soda Mountain Wilderness Study Area (WSA)

The official wilderness inventory was completed in 1980. Subsequently, a Statewide Wilderness EIS was completed with associated Record of Decision signed by the Secretary of Interior in 1991. Based on the Record of Decision, the President submitted proposed legislation to Congress in July, 1992. The Wilderness Study Areas (WSAs) that were inventoried and studied under Section 603 of FLPMA, and where recommendations are pending before Congress, are protected from actions that would impair their suitability for preservation as wilderness.

The recently issued BLM *Wilderness Inventory and Study Procedures* handbook (H-6310-1), provides for the possibility of new wilderness inventories and studies under the authority of Sections 201 and 202 of FLPMA. That guidance applies only to new inventory and land use planning efforts. Ongoing wilderness-related land use planning, such as this plan, should be completed using the State-specific guidance and procedures developed for these projects. The guidance developed for this ongoing planning effort was to use the results of the Section 603 wilderness inventory and study, which concluded with the Soda Mountain WSA and its recommendation as suitable for wilderness preservation. No other roadless areas in the present Monument were determined to meet the criteria for WSA.

Future management actions may facilitate an area meeting the requisite of wilderness characteristics, at which time the BLM will re-inventory the area for wilderness characteristics and evaluate the findings, using procedures described in H-6310-1. If the BLM determines that an area may have wilderness characteristics, and if actions are proposed that could degrade the wilderness values of the roadless character so as to disqualify the area from further consideration as a WSA, the BLM will consider in a NEPA document an alternative of mitigating or relocating the proposed action to avoid or minimize impacts on wilderness values; and will also consider the alternative of postponing a decision on the proposed action until the wilderness values can be addressed through a new land use plan or plan amendment.

Predominant Recreation Development

The CSNM management direction is to protect the objects identified in the Presidential Proclamation. Therefore, visitor use is secondary to the protection of the biological, hydrological, archaeological and geological resources for which the monument was established. An emphasis on recreation and associated development, outside of the Hyatt Lake Recreation Complex, is not consistent with the CSNM management goals and objectives.

Eliminating Prescribed Fire

Because of the importance of fire in natural ecosystem processes and the array of fire associated and/or dependent plant communities, the total elimination of prescribed fire as a management tool was not considered a viable or responsible option.

Monitoring

Monitoring is an essential component of natural resource management because it provides information on changes in resource use, condition, processes and trends. Monitoring also provides information on the effectiveness of management activities and strategies. The implementation of this Plan will be monitored to ensure that management actions follow prescribed management direction (implementation monitoring), meet desired objectives (effectiveness monitoring), and are based on accurate assumptions (validation monitoring). Some effectiveness monitoring and most validation monitoring will be accomplished by formal research. A comprehensive monitoring strategy for the Monument is listed as Appendix LL.

Monitoring will be an integral component of adaptive ecosystem management. Close coordination and interaction between monitoring and research are essential for this type of management. Data obtained through systematic and statistically valid monitoring can be used by scientist to develop research hypotheses related to priority issues. Conversely, the results obtained through research can be used to further refine protocols and evaluate the effectiveness of implementation of this Plan.

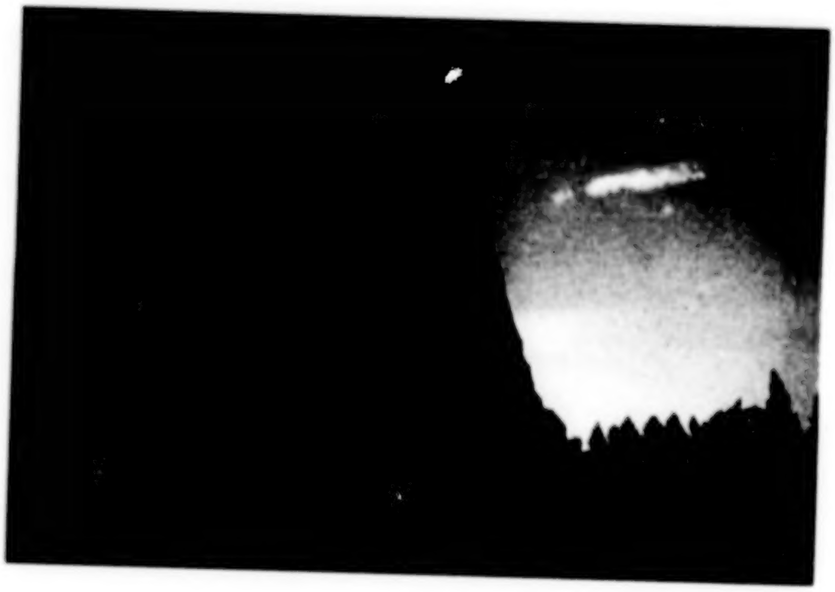
Monitoring results will provide managers with the information to determine whether an objective has been met, and whether to continue or modify the management direction. Findings obtained through monitoring, together with research and other new information, will provide a basis for changes to the Plan. The monitoring strategy itself will not remain static. The monitoring strategy will be periodically evaluated to insure that the monitoring questions and standards are still relevant. Adjustment to the monitoring strategy will be made as appropriate. Some monitoring items may be discontinued and others may be added as knowledge and issues change with implementation. Priorities will be given for monitoring mandated by executive order or legislation.

The monitoring process will collect information in the most cost effective manner possible, and may involve sampling or remote sensing. Monitoring could be cost prohibitive if not designed carefully. Therefore, it will not be necessary or desirable to monitor every management action or direction. Unnecessary detail and unacceptable costs will be avoided by focusing on key monitoring questions and proper sampling methods. The level and intensity of monitoring will vary, depending on the sensitivity of the resource, process or trend and the scope of the proposed management activity.

Limits of Acceptable Change

Monitoring will provide information that will allow managers to evaluate changes to Monument resource use, condition, processes and trends. Not all changes will be positive and management strategies must be adjusted to deal with unacceptable changes. Limits must be established that initiates adjustments in management activities. The limits of acceptable change for the CSNM would be any discernable unnatural negative change to key resource condition and processes. Once identified, immediate action would occur to eliminate or minimize the activities causing the negative change and a strategy would be implemented to restore the resource condition or process.

CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES



INTRODUCTION

This chapter describes the environmental consequences of implementing any of the planning alternatives (Alternatives A-D) described in Chapter 3. Alternative A, the "No Action" Alternative, is current interim management which is in accordance with the management direction provided in the Medford District Resource Management Plan (RMP) (USDI 1995a) and is used only as a baseline from which to compare the other alternatives. As a result of Alternative A being within the guidance of the Medford District RMP, only a cursory analysis of the affects of implementing Alternative A is provided. Chapter 4 focuses on the potential affects of the proposed alternatives on important resources, processes, uses, and activities described under, Existing Conditions, Chapter 2. Specific attention will be focused on:

- Protection of Monument objects as directed in the Presidential Proclamation
- Ecosystem and Landscape Health
- CSNM Cultural and Biological resources including soils, hydrology, aquatic and riparian resources, wildlife (including special status animal species), vegetation (including special status plant species, weeds, and forest health).
- CSNM Uses and Users including impacts of forestry product use, recreational use, facilities/rights-of-way and scenic quality.
- Social and Economics including local and regional economies projected from each of the alternatives.

Direct, indirect and cumulative impacts (both positive and negative) are addressed for each resource, use or activity. Cumulative impacts are the effects on the environment of each alternative when considered with the effects of past, present, and reasonably foreseeable future actions that might occur inside and/or adjacent to the CSNM.

ENVIRONMENTAL CONSEQUENCES

Analysis Assumptions and Guidelines

The following assumptions and guidelines were used to guide and direct the analysis of environmental consequences:

1) The action alternatives would be implemented substantially, as described in Chapter 3, including the Management Common To All Action Alternatives.

2) The Bureau of Land Management would have sufficient funding and personnel to implement and enforce the plan.

3) Current trends in recreation use would continue.

4) The planning period for the analysis is the next 10 years at which time the BLM will evaluate the plan and make necessary adjustments. Short-term impacts are those that would occur during the first five years of plan implementation. Long-term impacts are those that would occur beyond the first five years.

5) Specific actions to protect human life would be taken regardless of the management criteria in the plan alternatives.

6) Livestock grazing in the Monument will continue at present levels (Alternative A) and will be governed by applicable laws and regulations. Once sufficient data is available from the Draft Study of Livestock Impacts on the Objects of Biological Interest in the Cascade-Siskiyou National Monument (USDI 2001), a resource management plan amendment addressing livestock grazing activities would be completed.

7) Research and monitoring would be fully funded.

8) The Best Management Practices (Appendix AA) and Monument Aquatic Conservation Strategy (Appendix BB) are common to all action alternatives (Alternative B-D) and are incorporated in the analysis.

9) Site specific NEPA analysis including required surveys would be accomplished before implementation of activities in the proposed alternatives.

Ecological Processes and Landscape Health

Landscape-level criteria affecting ecosystem health include; late-seral conifer connectivity, late-seral conifer fragmentation, and percentage acute disturbance within the range of existing plant communities. These criteria affect the ability of organisms to disperse across the landscape, the abundance of habitat for late seral dwelling organisms, edge effects impacting late seral habitat, and interactions between late seral associated organisms and edge dwelling organisms. Also important are the relative dominance of active processes (fire, timber harvest, livestock grazing) on the current versus historical landscape, and the characteristics of their action across the landscape (frequency, patch size, severity, and pattern). Text within Table 4-1 describe current and desired future condition relating to the identified landscape criteria.

Table 4-1. Current and Desired Future Conditions for Landscape Criteria

Landscape Criteria	Current Condition	Historic Processes/Desired Future Condition
Late-Seral Conifer Connectivity	Past timber harvest activities and the potential for stand replacement wildfire may alter late-seral conifer abundance and connectivity.	Conifer connectivity maintained and enhanced as a result of the predominance of low severity (non-stand replacement) restoration and fuel reduction.
Late-Seral Conifer Fragmentation	Pattern of land ownership and timber harvest practices break late-seral conifer community into small and temporally static patches.	Land ownership pattern and management actions that reduce fragmentation and favor spatial and temporal conifer connectivity.
Percent Acute Disturbance	Disturbance regime and management practices result in an accumulation of acute disturbance across the landscape.	No new long-term acute disturbance (heavy machinery on fragile soils, limit new roads, intense silvicultural practices).
Recovery of Current Acute Disturbance	Acute disturbance accumulates across the landscape	Active restoration of past acute disturbance
Reintroduction of Fire as an Ecosystem Process	Fire used as silvicultural tool only to reduce slash.	Fire is used with silvicultural practices to attain healthy ecosystem and the full range of conditions within all plant communities.
Disturbance Patch Size	Location and size of disturbance determined by land ownership and does not mimic natural disturbances	Disturbance patch size matches historical patch size and forest health objectives
Frequency of Disturbance (fire and silviculture)	Disturbance frequency matches availability of merchantable trees.	Disturbance frequency matches maintenance of healthy ecosystems.
Disturbance Severity	Continued silvicultural practices, road construction maintenance, uncontrolled visitation, etc. results in an accumulation of acute disturbance.	Low severity disturbance, both spatially and temporally, predominate across the landscape.
Private Land Acquisition for Maintaining Rare and Functionally Important Plant Communities	Many rare and functionally important plant communities are not included within the current CSNM boundaries.	Acquire private lands from willing owners to ensure the maintenance of rare and functionally important plant communities.
Maintenance of Rare Plant Communities	Continued attrition of rare plant communities through weed invasion, fire suppression, human visitation, etc.	The full range of plant communities (a component of biological diversity) are maintained by natural ecological processes.
Practice Adaptive Management including: Pilot Studies, Multiple Treatments, Monitoring within Fixed Plots, and Landscape-level Biological Surveys	Annual budgets and lack of funding frequently do not allow for pilot studies, permanent monitoring plots, landscape surveys, and restoration of non-conifer plant communities.	Practice adaptive management and make use of local educational institutions & students to complete studies; look towards grant writing to fund monitoring and restoration across fiscal years.

Several assumptions are made to allow the interpretation of trend under the alternative management regimes:

- Trends in weed invasion are likely to continue under the current management regime.
- The conifer component of the monument analysis area is dominated by the mid-seral condition.
- Conditions on private land are likely to remain early seral in the longer term.
- Acute disturbance results in changes of vegetation structure not considered part of desired plant community dynamics and requiring extended periods of recovery/restoration to be considered within the range of natural variability.
- Fire is considered a critical ecological process lacking from the current monument landscape (Alternative A).
- Lack of density management will result in larger and more intense fires over time (Alternative A).
- The use of heavy equipment is necessary to achieve initial restoration objectives relating to plant community composition and structure and the reintroduction of fire across the landscape.

It is apparent that Alternatives A and B are similar and result in minimal improvement of the landscape in the context of the landscape criteria.. Alternatives C and D result in a far greater improvement relative to Alternatives A and B. The ability to use of heavy equipment in Alternative D facilitates the treatment of fuels thereby allowing the re-introduction of fire in a broader area across the landscape.

The alternatives offer no distinction in the acquisition of private lands. Changes in criteria such as late-seral conifer connectivity are therefore dependent on the effects of management practices for the progression of conifer stands towards late-seral condition and the ability to reintroduce fire to the ecosystem. Tables 4-16, 4-17, 4-18 and associated text provide information of grass/shrub/woodland and conifer stand-level issues necessary to understand how landscape criteria are affected by the management alternatives.

Table 4-2 identifies whether the management alternatives have the ability to move current conditions towards the desired future condition(s) described in table 4-1 .

Table 4-2. Trends toward Desired Condition for Landscape-Level Criteria identified in Table 4-1.

Landscape Criteria	Alt. A	Alt. B	Alt. C	Alt. D
Late-seral Conifer Connectivity Consequent to Potential Private Land Acquisition	U	U	U	U
Late-seral Conifer Fragmentation	U	U	I	I+
Percent Acute Disturbance	U	I	I	I+
Recovery of Current Acute Disturbance	D	D	I	I+
Reintroduction of Fire as Ecosystem Process	D	D	I	I+
Disturbance Patch Size	D	D	I	I+
Frequency of Disturbance (fire and density management)	U	I-	I	I+
Disturbance Severity	D	D	I	I+
Potential Private Land Acquisition for Maintaining Rare and Functionally Important Plant Communities	U	U	U	U
Maintenance of Rare Plant Communities	U	I-	I+	I+
Practice Adaptive Management including: Pilot Studies; Multiple Treatments; Monitoring	U	U	I	I

D = Decline I = Improve U = Unaffected (- small change; + large change)

Cultural Resources

Proposed management activities having the potential to effect cultural resources are: off-highway vehicle use, timber harvest, focused/intensive grazing, burning, trail and road building, and road decommissioning. Adverse effects to archaeological/ historical sites is most easily mitigated through site avoidance. Where avoidance is not possible or practical, scientific study of the affected sites may mitigate the anticipated damage to them. Scientific study requires further consultation with concerned Native American groups and other interested parties, and may require consultation with the State Historic Preservation Office and the Advisory Council on Historic Preservation. Since scientific study usually involves excavation, it may also require further environmental review to assess the effects on other aspects of the environment. When there are conflicts between the need to mitigate damage to sites through excavation and the need to protect other values, adverse effects to sites might occur.

Potential Effects by Action

Off-Highway Vehicle Use: Off-highway vehicle use is currently heaviest in the southeastern portion of the CSNM which also has the highest density of archaeological sites. This area is flat and comparatively open; OHV use takes place throughout the area regardless of road designation. OHV use is severely and adversely impacting archaeological sites by displacing surface materials, churning subsurface soils, and disrupting the archaeological context, thus causing irretrievable loss of archaeological information at affected sites. When soils are wet and malleable the impacts are even greater. Avoidance of future effects to archaeological sites will be possible only through strict enforcement of road closures. However, it is difficult to control OHV use off designated routes; consequently unintended effects to archaeological sites from unauthorized use are likely.

Due to the number and density of archaeological sites in the area, mitigation of effects to archaeological sites through scientific investigation would be a major undertaking requiring phased archaeological study over several years and consultation with numerous groups, individuals, and agencies. Should consultation reveal legitimate concerns on the part of concerned Native American groups, according to cultural resource law and regulation, scientific study and excavation of sites may not be sufficient or appropriate to mitigate effects to the archaeological sites, and adverse effects would be likely.

Grazing: Dispersed grazing does not constitute an effect on archaeological resources, except for locations where specific land disturbing developments (e.g. spring improvements, fencing) are initiated. Where grazing activity is not dispersed, but is focused and intensive, such activity may affect archaeological sites through trampling, churning of soils, and displacement of archaeological materials. Impacts from concentrated grazing may be avoided by designing project which avoid archaeological sites.

Timber harvest: Timber harvest is a ground disturbing activity and has the potential to affect archaeological sites through direct impacts to sites. Such impacts may be mitigated by designing projects to avoid archaeological sites.

Roads: Road construction as well as road decommissioning or obliteration may affect archaeological sites through displacement of subsurface materials and destruction of archaeological context. These activities will need to be studied and designed appropriately. In Table 4-3, slightly higher potential impacts are assigned to those alternatives calling for increased road decommissioning, obliteration, or construction.

Recreation: Archaeological sites in the CSNM currently suffer from unauthorized collecting, which removes significant artifacts from the surface of sites and depletes the archaeological value of those sites. Increased recreational use of the CSNM, especially in those areas with a high density of archaeological sites, will increase this adverse impact to sites.

Burning: Fire is not likely to affect most of the archaeological sites in the CSNM. The remaining historic structures at the former Box-O Ranch, as well as other wooden structures in the CSNM, should be avoided during controlled burns. When avoidance is not possible, impacts may be mitigated by thorough documentation of the historic structure.

The potential for cumulative adverse effects is rated below by taking into account the possibility for mitigation of effects through site avoidance.

Table 4-3. Potential for Adverse Cumulative Effects to Cultural Resource

Alternative	Alt. A	Alt. B	Alt. C	Alt. D
Grazing	L	L	L	L
Timber	L-M	L	L-M	L-M
Roads	L-M	L-M	L-M	M
OHV	L-M	L-M	L	L
Recreation	M	M	M	M
Burning	L	L	L	L
Minerals	N	N	N	N

L = low M = medium H = high N = no impact

Soils

The majority of the soils within the CSNM are influenced by montmorillonitic clays, have high rock content and/or are shallow in depth (see Chapter 2 for details). These soil characteristics make the soils of the CSNM very vulnerable to impacts from management activities and recreational use. Two main concerns will be addressed when describing the effects of the alternatives to the soil resource: soil erosion and soil productivity.

Soil erosion is the detachment and movement of soil by water, wind, ice or gravity. Erosion is a natural process that uses these same forces to form soil from rock in the process known as weathering. Soil erosion is of concern when it accelerates, moving soil particles off site faster than they can accumulate from the weathering of rock. Two detrimental actions occur when soil erosion by water is accelerated. First, eroded soil particles, especially clay particles, often become suspended in water forming sediments that affect water quality. Second, soil decreases in depth when the soil profile loses more particles than it accumulates. Loss of soil depth diminishes water holding capacity and rooting space available for plant growth resulting in a reduction in soil productivity.

Nutrient recycling is another soil productivity concern. It is important that nutrients contained in organic matter, available from needle/leaf fall, plant and animal mortality, animal fecal matter, etc., be consumed, assimilated by insects and soil organisms and returned to the soil. Soil nutrient recycling is very important to soil health, and the plants and animals that depend on it. Soil and plant communities form a sort of symbiotic relationship. When a particular plant community becomes established on a site, a specific group of microorganisms dominate the soil. These organisms become very efficient at recycling plant material and organic matter created by that plant community. Generally, the healthier the plant community, the healthier the soil (and vice-versa). This soil-plant relationship can grow and change slowly overtime. As a plant community matures and produces more organic material, the soil organism population increases and recycles more organic material thus supplying nutrients back to the plants, improving soil structure, water holding capacity and disease suppression (USDA 1999). This process continues until a disturbance agent, such as fire, insect infestation, human activities, etc., breaks the cycle. At this point the soil-plant relationship becomes unbalanced, soil organism types and number are affected which ultimately affects the health of the soil.

The proposed alternatives will have an effect on soil erosion and soil productivity. The baseline against which Alternatives B-D will be measured is Alternative A (No Action). No action, in this case, means that management direction and associated effects to the soil resource would not change from current interim management. The Best Management Practices (BMPs) and Monument Aquatic Conservation Strategy (Appendices AA and BB) would provide adequate guidance and protection when implementing land management practices under any of the proposed alternatives. In addition the Coarse Woody Debris Standards and Guidelines (Appendix JJ) will aid in sustaining soil productivity in the conifer forest. Cattle grazing would continue at current levels under all alternatives and will not be addressed until the completion of the study of its effects on biological resources and processes in the Monument.

Alternative A

Actions taken in Alternative A have minimal short term effects on the soil resource as little ground disturbing activities are occurring which would increase erosion rates and decrease soil productivity. Long-term, taking no action to reduce the fire hazard across the Monument increases the risk of catastrophic fire which would increase erosion rates dramatically and lower soil productivity. In the long-term, all alternatives would have positive effects to the soil resource compared to Alternative A. Although Alternative A does confine mechanized vehicles to designated roads and temporarily closes 77 miles of road, the soil erosion rates from these roads will remain slightly above natural levels. Enforcement of the road closures has been limited as a result of limited law enforcement resources. Closing the Schoheim road (BLM 41-2E-10.1) and associated roads in the Agate Flat area have greatly decrease the amount of soil erosion occurring as a result of mechanized vehicles particularly during the wet season.

Alternative A does not include vegetation manipulation activities (except for noxious weed suppression) which will continue to maintain soil erosion rates at near natural levels. Activities in the action alternatives such as brushing, pre-commercial tree thinning and prescribed burning would minimally increase soil erosion rates which has a slight short-term negative effect but positive long-term effect as it aids in reducing the hazard of catastrophic wildfires. All alternatives would limit some access for fire suppression activities slightly increasing the chance of large wildfires which could be detrimental to the soil resource. This wildfire potential would be offset to some degree in all but Alternative A by successful vegetation management aimed at reducing the areas of high fuel hazard across the Monument landscape.

Alternative B

Alternative B would have moderate short-term positive effects to the soil resource of the Monument when compared to Alternative A. An emphasis on closing roads (31 miles), natural decommissioning of roads (49 miles) or improving the transportation system (3 miles) reduces the soil erosion potential particularly on natural surface roads. The drainage facilities would be improved on all 83 miles of road proposed for management activities but roads that are naturally decommissioned would have culverts removed, natural drainage ways re-established and entrance blocked so that future disturbance could not occur. Natural vegetation would be allowed to re-establish over time. Although natural decommissioning disturbs the less soil than mechanized decommissioning, vegetation re-establishment may take longer (3-10 years) and erosion rates would remain slightly above natural levels until this occurs.

Vegetation manipulation planned under Alternative B is essentially brushing and pre-commercial thinning 3,400 acres of young conifer stands over the next 10 years and continuing the effort to reduce noxious weeds. The excess fuels created by the vegetation management activity would most likely be burning of slash piles which would affect one to two percent of the total treated acreage. This would cause minimal surface disturbance resulting in a slight short-term increase in erosion rates and soil productivity loss. Cumulative effects of Alternative B to the soil resource would be insignificant.

Alternative C

Alternative C would have slight negative effects short-term as approximately 24 miles of existing roads are planned to be mechanically decommissioned. Most of these roads are in the southern portion of the Monument and an increase in erosion and sedimentation would occur the first few years after the decommissioning. Long-term, the soil would be put back into producing vegetation and natural drainage patterns would become stable. Natural decommissioning would occur on about 28 miles of existing roads in the Monument which would have minimal soil disturbance and slight short-term effects. The naturally decommissioned roads would take longer to re-establish vegetation and stabilize drainage facilities than mechanical decommission. Approximately 21 miles of road would have the drainage facilities improved and then blocked which would reduce erosion and sedimentation short-term. About 4 miles of road would be seasonally closed with gates. The remaining road system would receive maintenance based on the transportation management objectives which would continue to provide adequate drainage and limit erosion.

Vegetation manipulation planned under Alternative C could affect up to 7,726 acres over the next ten years for fuel hazard reduction to aid in protecting existing late-successional and old-growth habitat. The majority of the treatment would be the thinning of dense tree stands and burning the excess fuel created by the thinning. Up to 3,000 acres of conifer forest in mid-seral condition could be commercially thinned in the next ten years. Although moderate direct, short-term negative impacts to the soil resource would occur on these acres, Best Management Practices (Appendix AA) should limit the effects. Another 2000-plus acres could be treated in the Diversity Emphasis Area to protect, maintain or restore native plant communities. Most of the treatments would involve broadcast burning which could bare the soil for a short time period and cause a slight short-term increase in erosion rates within the treatment areas. Overall, there is potential that an average of about 1,000 acres a year would be disturbed as a result of vegetation management activities. If the treatment units are several and spread across the landscape, minimal cumulative soil affects would be realized. Long-term these vegetation treatments could increase soil productivity and stabilize the erosion potential by reducing the risk of catastrophic wildfire.

Alternative D

Alternative D would have the greatest effect on the soil resource when compared to the other alternatives. Approximately 52 miles of existing roads would be mechanically decommissioned and 6 miles of existing road to be naturally decommissioned. Affects would be similar to those described in Alternative C but direct short-term negative effects would double as twice the amount of roads are being mechanically decommissioned. Along with approximately 19 miles of additional roads being closed to public access, 3 miles of road would be improved and left open for extended season use. This road management proposal would have slight to moderate negative short-term effects as erosion rates increase but moderate positive long-term effects.

Table 4-4. Cumulative Effects on Soils as a result of Proposed Alternatives

Alternative A	Alternative B	Alternative C	Alternative D
Short-term			
low negative	low negative	low negative	moderate negative
Long-term			
low negative	low positive	moderate positive	moderate positive

Vegetation manipulation planned under Alternative D could affect up to 14,000 acres of land for LSOG habitat protection and potentially another 1,000 acres of for native plant community protect, maintenance and/or restoration. There is the potential of commercial timber harvest occurring on an estimated 11,000 acres (approximately 20 percent of the Monument) over the next 10 years. Incorporating BMPs would minimize the direct short-term impacts but disturbing 20 percent of the Monument in a 10 year period along with road management activities could cause moderate erosion rate increase resulting in slightly negative short-term cumulative but moderate positive impacts long-term.

Hydrology

Proposed management activities likely to have the greatest affect on the streamflow regime within the CSNM are roads, grazing, and vegetation management. Table 4-5 shows how the proposed management activities could affect hydrologic processes within the CSNM. The degree to which these activities affect the peak and low flows varies by alternative. Activities that result in soil compaction or vegetation removal would have the greatest likelihood of increasing the frequency and magnitude of peak flows above natural conditions. Low flows are primarily affected by water diversions for activities such as livestock watering and road operations; and by riparian vegetation removal that leads to lowering of the water table.

Table 4-5. Potential Changes to Hydrologic Processes due to Proposed Management Activities

Proposed Management Activities	Potential Changes to Hydrologic Processes that Affect Streamflow	Potential Changes to Streamflow
	Peak Flows	
Roads	• Reduced infiltration due to compaction: increases surface runoff, decreases groundwater, and reduces time to reach peak. • Disruption of subsurface flow: increases surface runoff, decreases groundwater, reduces time to reach peak. • Increased snow accumulation in transient snow zone. • Decreased snow melt time in transient snow zone.	• Reduced time to hydrograph peak. • Increased frequency of peak flows. • Increased magnitude of peak flows.
Grazing	• Reduced infiltration (see roads).	• Reduced time to hydrograph peak. • Increased frequency of peak flows. • Increased magnitude of peak flows.
Vegetation Management	• Reduced infiltration (see roads). • Reduced interception and evapotranspiration: increases groundwater. • Increased snow accumulation in transient snow zone. • Decreased snow melt time in transient snow zone.	• Reduced time to hydrograph peak. • Increased frequency of peak flows. • Increased magnitude of peak flows.
	Low Flows	
Roads	• Decreased summer streamflow due to water withdrawals for road construction/maintenance.	• Decreased magnitude of low flows.
Grazing	• Decreased summer streamflow due to water withdrawals for livestock. • Lowered water table due to riparian vegetation removal	• Decreased magnitude of low flows.
Vegetation Management	• Reduced evapotranspiration: increased groundwater.	• Increased magnitude of low flows (short term).

Table 4-6 provides a comparison of the potential adverse effects on streamflows (listed in table 4-5) by alternative and proposed management activity. The Best Manangement Practices and Monument Aquatic conservation Strategy (Appendices AA and BB) are common to all action alternatives. Livestock grazing is expected to continue at current levels (Alternative A) until completion of the grazing impact study. Consequently, affects of grazing on streaflows would be the same under all alternatives.

Table 4-6. Comparison of Alternatives for Potential Adverse Effects on Streamflows

Resource Value Affected	Potential for Adverse Effects on Streamflows by Alternative and Activity			
	A	B	C	D
		Roads		
Peak Flows	M	M	L-M	L
Low Flows	L	L	L	L
		Grazing		
Peak Flows	L-M	L-M	L-M	L-M
Low Flows	L-M	L-M	L-M	L-M
		Vegetation Management		
Peak Flows	VL	L	L-M	L-M
Low Flows	N	N	N	N

NA: not applicable N: no potential for adverse effects VL: very low potential for adverse effects
L: low potential for adverse effects M: moderate potential for adverse effects

Table 4-7, below, shows a comparison between alternatives of the potential for cumulative effects on peak and low streamflows.

Table 4-7. Comparison of Alternatives for Cumulative Effects on Streamflows

Resource Value Affected	Potential for Cumulative Effects on Hydrology by Alternative			
	A	B	C	D
Peak Flows	L-M	L-M	L-M	L-M
Low Flows	L	L	L	L

WATER QUALITY

Proposed management activities likely to have the greatest affect on water quality within the CSNM are roads, grazing, vegetation management, and recreation. Temperature, dissolved oxygen, bacteria/pathogens, and turbidity/sediment are the key water quality indicators for the beneficial uses most sensitive to the proposed activities. Table 4-8 shows how the proposed management activities could affect these key water quality parameters within the CSNM. The degree to which these activities affect water quality varies by alternative. Activities that result in surface disturbance, riparian vegetation removal, or water contamination would have the greatest likelihood of adversely affecting water quality.

Table 4-8. Potential Changes to Water Quality due to Proposed Management Activities

Proposed Management Activities	Potential change to Processes that Affect Water Quality	Potential Changes to Water Quality
Roads	• Riparian vegetation removal due to new road construction: reduced stream shade, increased erosion, and increased channel width-depth ratio. • Surface disturbance due to road construction/maintenance: increased erosion and increased channel width-depth ratio.	• Increased temperature. • Decreased dissolved oxygen. • Increased turbidity/sediment.
Grazing	• Riparian vegetation removal: reduced stream shade, increased erosion, and increased channel width-depth ratio. • Streambank disturbance: increased erosion and increased channel width-depth ratio. • Water quality contamination due to livestock in streams.	• Increased temperature. • Decreased dissolved oxygen. • Increased turbidity/sediment. • Increased bacteria/pathogens.
Vegetation Management	• Surface disturbance due to yarding: increased erosion and increased channel width-depth ratio.	• Increased temperature. • Decreased dissolved oxygen. • Increased turbidity/sediment.
Recreation	• Water quality contamination due to inadequate waste disposal by recreational users. • Surface disturbance due to trail building: increased erosion.	• Increased bacteria/pathogens. • Increased turbidity/sediment.

Table 4-9 provides a comparison of the potential adverse effects on water quality (listed in table 4-8) by alternative and proposed management activity. The Best Management Practices and Monument Aquatic Conservation Strategy(Appendices AA and BB) are common to all action alternatives. Livestock grazing is expected to continue at the current level (Alternative A) until completion of the grazing study. Consequently, affects of grazing on streamflows would be the same under all alternatives.

Table 4-9. Comparison of Alternatives for Potential Adverse Effects on Water Quality

Water Quality Parameter Affected	Potential for Adverse Effects on Water Quality by Alternative and Activity			
	A	B	C	D
Roads				
Temperature/Disolved Oxygen	L-M	L-M	L-M	L-M
Bacteria/Pathogens	NA	NA	NA	NA
Turbidity/Sediment	L-M	L-M	L-M	L-M
Grazing				
Temperature/Disolved Oxygen	M	M	M	M
Bacteria/Pathogens	M	M	M	M
Turbidity/Sediment	M	M	M	M
Vegetation Management				
Temperature/Disolved Oxygen	VL	L	L	L
Bacteria/Pathogens	NA	NA	NA	NA
Turbidity/Sediment	VL	L	L-M	L-M
Recreation				
Temperature/Disolved Oxygen	NA	NA	NA	NA
Bacteria/Pathogens	M	L	L-M	L-M
Turbidity/Sediment	VL	VL	L	L

NA: not applicable VL: very low potential for adverse effects
L: low potential for adverse effects M: moderate potential for adverse effects

Water quality limited streams within the CSNM that are included on Oregon's 1998 303(d) list are shown in Table 2-9. These streams are all listed for exceedance of the state temperature standard. Table 4-10 provides a comparison of the alternatives for probable effects on the 303(d) listed streams. The streams showing no change are primarily on private land and BLM management would not have a significant affect on stream temperatures.

Table 4-10. Comparison of Alternatives for Probable Effects on 1998 303(d) Streams

Stream Name	Probable Effects on 303(d) Streams by Alternative			
	A	B	C	D
Beaver Creek	0	0	0	0
Corral Creek	0	0	0	0
Jenny Creek	+	+	+	+
Johnson Creek	0	0	0	0
Keene Creek	+	+	+	+
South Fork Keene Creek	+	+	+	+
Lincoln Creek	+	+	+	+
Mill Creek	0	0	0	0
Baldy Creek	0	0	0	0
Carter Creek	0	0	0	0
Emigrant Creek	0	0	0	0
Hobart Creek	0	0	0	0
Tyler Creek	0	0	0	0

1/ See table 2-9 for description of listed segment.

+ = beneficial effect; - = adverse effect; 0 = no change

Table 4-11 shows a comparison between alternatives of the potential for cumulative effects on water quality.

Table 4-11. Comparison of Alternatives for Cumulative Effects on Water Quality

Water Quality Parameter Affected	Potential for Cumulative Effects on Hydrology by Alternative			
	A	B	C	D
Temperature/Dissolved Oxygen	L-M	L-M	L-M	L-M
Bacteria/Pathogens	M	M	M	M
Turbidity/Sediment	L-M	L-M	L-M	L-M

Aquatic and Riparian Habitat

This analysis will evaluate the affects of the proposed alternatives based on the assumptions that all activities will comply with the Best Management Practices (BMPs) and the Monument Aquatic Conservation Plan (Appendix AA and BB, respectively). In addition, it is assumed that adequate funding will be available to fully implement the Plan, and required surveys would be completed before project implementation. During the implementation phase, all proposed actions would be analyzed under the NEPA process to determine if the BMPs and Monument Aquatic Conservation Plan objectives are being met. Management actions that do not maintain the existing aquatic habitat condition or lead to improved conditions in the long-term would not meet the intent of either the BMPs or the Monument Aquatic Conservation Strategy would be adjusted or not be implemented. Aquatic habitat restoration efforts are an important objective, although secondary to protection, and would be pursued when possible.

Alternatives are analyzed for their short-term, long-term, and cumulative effects on aquatic species and their habitats. In general, native fish and other aquatic organisms need clean, cool water with cover, spawning gravel, and food to survive. Riparian vegetation plays an important role in maintaining healthy habitat for aquatic organisms. Large wood creates habitat for salmonids by providing cover from predators, refugia from current, and by creating pools. The water that flows through these systems must be of cool temperatures to support cold water fish and gravel, free of oxygen-choking sediments is a necessity for spawning fish. The following discussion will address the activities planned under each alternative and the effects on aquatic species and their habitats.

Alternative A

The "No Action Alternative" would only perpetuate interim management and does not adequately provide or create opportunities for enhancement of the Monument values beyond the immediate protective measures of the Proclamation. Therefore, Alternative A is having minimal short-term negative effects to aquatic resources as the current trend continues. It would have moderate long-term negative effects as roads would be minimally maintained and the high fire hazard conditions increase. Alternative A will be used to compare current interim management with various strategies for active management (Alternatives B, C and D).

Alternative B

Activities proposed under this alternative that may impact aquatic species and their habitat are road decommissioning and vegetation management.

Alternative B proposes natural decommissioning 49 miles of road, closing 31 miles, and improving 3 miles. Reducing road densities is expected to decrease the overall amount of sediment delivered to streams and therefore, improve aquatic species habitat. Blocking, decommissioning, and/or improving road drainage on roads within Riparian Reserves may briefly increase fine sediment input to the system. These actions, however, are expected to reduce road-caused sedimentation over the long-term and allow riparian vegetation to become re-established on road surfaces. As trees grow up in the road bed their roots loosen the compacted soil restoring groundwater flow, thus improving the humid character of the riparian area. These trees also contribute organic material to the streams, provide shade, and increase potential large wood for instream complexity. Long-term recovery of these road systems would be slow as compacted soils in the road prism and cut banks/fill slopes associated with these roads are left to re-vegetate naturally.

Alternative B focuses on promoting continued and accelerated development of late-successional and old-growth habitat by treating the early to mid-seral stage conifer stands that have potential of becoming late-successional and old-growth habitat (habitat type 3). Vegetation management under this alternative focuses on reforestation and some thinning efforts. Reforestation would be beneficial to aquatic organisms and their habitats. Upland thinning would reduce the fire hazard and accelerate development late-successional characteristics. Thinning activities in the uplands would have limited ground disturbance and, therefore, would not be expected to adversely effect aquatic organisms or their environments. The long-term effects of thinning and acceleration toward late-successional characteristics would improve aquatic habitats by increasing riparian shade and eventually contributing large diameter wood to the stream systems.

Thinning within the riparian reserves would only be initiated to improve riparian and stream habitat. For example, a stand with uniformly-aged young trees might be thinned slightly to encourage increase tree size and species diversity as well as understory canopy layering (for riparian habitat improvement and improved nutrient input to stream). Trees that might provide large wood to stream systems would not be removed.

Alternative C

Activities proposed under Alternative C that may impact aquatic species and their habitat are road decommissioning and vegetation management.

Road decommissioning under Alternative C would include a combination of mechanical and natural decommissioning, road closures, and drainage improvements. Mechanical decommissioning of approximately 24 miles of road would increase erosion and sedimentation in the short-term but these initial, short-term surges of sediment are not expected to adversely effect aquatic species. Natural decommissioning would occur on approximately 28 miles of existing road within the Monument and would contribute less sediment to the system than if the roads were left open. However, the naturally decommissioned roads would take longer to re-establish vegetation and hydrologic function. Road closures and drainage improvements would occur on approximately 25 miles of existing road. Culvert repair, replacement, and/or removal might also contribute an initial pulse of fine sediment to the system due to the instream nature of this work. Potential short-term sediment pulses from these activities are not expected to adversely effect aquatic species. Over the long-term, road decommissioning, road closures, and drainage improvements would reduce sedimentation and peak flows that negatively affect aquatic species and their habitats.

Under Alternative C, one objective is to protect existing and potential late-successional and old-growth habitat from the threat of habitat loss due to catastrophic disturbance (i.e., intense wildfire). If such a fire were to burn across a stream and associated riparian area, it could cause erosion, channel downcutting, sedimentation, and pool filling. Losing riparian vegetative cover would increase water and air temperature which could have substantial negative effects on aquatic species and their habitats. Thinning could reduce the potential for such a catastrophic event and encourage late-successional forest characteristics. Thinning activities in the uplands would have limited ground disturbance and, therefore, would not be expected to adversely effect aquatic organisms or their environments. The long-term effects of thinning would improve aquatic habitats by increasing riparian shade and eventually contributing large diameter wood to the stream systems. Restoration projects could be initiated in stream systems where large wood is lacking. Adding large wood to these systems would provide cover, add complexity to the stream systems, and create pools.

Alternative C attempts to maintain, protect, and restore seeps and springs which are valuable objects of the Monument. Seeps and springs are vulnerable to impacts by livestock. Altered livestock management such as herding and salting would facilitate wetland plant community recovery. Fencing would be used to exclude livestock. Fencing seeps and springs would improve water quality conditions in areas where trampling, sedimentation, and lack of shade negatively affect water quality and aquatic organisms, specifically endemic mollusk species.

Alternative D

Activities proposed under this alternative that may impact aquatic species and their habitat are road decommissioning and vegetation management. Approximately 52 miles of existing roads would be decommissioned mechanically under this alternative. This alternative would mechanically decommission almost twice as many road miles as Alternative C. Mechanical decommissioning would increase erosion and sedimentation in the short-term but these initial, short-term surges of sediment are not expected to adversely effect aquatic species. Over the long-term, hydrologic recovery would occur more quickly than with natural decommissioning. Additionally, 19 miles of roads would be closed to public access and 3 miles of road would be improved or left open for extended season use.

Under Alternative D, vegetation management is more extensive than under other alternatives. Vegetation manipulation could take place on 14,000 acres of LSOG for habitat protection and another 1,000 acres for native plant community protection, maintenance, and restoration. Combined with the road activities the short-term direct affects could result in a substantial amount of sedimentation. In most years, insufficient streamflow would not flush these sediments out of the system resulting in embedded streambed substrates. The lack of well sorted, clean gravel is detrimental to spawning activities and egg incubation.

Alternative D attempts to maintain, protect, and restore seeps and springs as valuable objects of the Monument. Seeps and springs are vulnerable to impacts by livestock. Altered livestock management such as herding and salting would facilitate wetland plant community recovery. Fencing would be used to exclude livestock. Fencing seeps and springs would improve water quality conditions in areas where trampling, sedimentation, and lack of shade negatively affect water quality and habitat for aquatic organisms, specifically endemic mollusk species.

Table 4-12 summarizes the effects of the proposed alternatives to aquatic species and habitats.

Table 4-12. Effects of Proposed Alternatives on Aquatic Species and Habitats

Alternative A	Alternative B	Alternative C	Alternative D
Short-term			
- Status quo	- Moderate decrease in sediment from closing roads	- Potential sediment pulses from road decommissioning - Improved condition of seeps and springs	-Potential sediment pulses from road decommissioning - Improved condition of seeps and springs
Long-term			
- Maintain hazardous fire conditions	- Slow recovery of naturally decommissioned roads resulting in above "natural level" sedimentation rates for a longer period of time - Improved CWD recruitment, lower water temperatures, increase in humidity as a result of an acceleration toward late-successional characteristics in riparian areas - Reduced fire hazard resulting in decrease risk of catastrophic disturbance in riparian areas	- Faster recovery of decommissioned roads resulting in sedimentation rates returning to "natural levels" within a few years after decommissioning - Reduced fire hazard resulting in decrease risk of catastrophic disturbance in riparian areas	- Faster recovery of decommissioned roads resulting in sedimentation rates returning to "natural levels" within a few years after decommissioning -Reduced fire hazard resulting in decrease risk of catastrophic disturbance in riparian areas.

Terrestrial Wildlife

Except for differences in habitat modification allowed under each alternative, the alternatives are almost equal in their expected effects on wildlife. The alternatives have many common features as described in the section on management common to all alternatives. The alternatives all have similar amounts of open roads. In terms of protecting wildlife and habitat from human caused impacts associated with trails, pack stock use, visitor facilities, utility rights of way, and recreationists encroaching on wildlands, the alternatives would be ranked as follows:

- Alternative B(most protective)
- Alternative C
- Alternative D
- Alternative A(least protective).

Accurately quantifying the differences between the alternatives in terms of non-habitat management related effects would be impossible. Furthermore, if it was possible to perform such an analysis, the differences between the alternatives based on such an analysis would be inconsequential when compared to the differences between the alternatives based on the differing amounts and intensities of habitat management allowed in the alternatives.

Because the other differences between the alternatives are so minor, the effects analysis for wildlife focuses on the various ways in which the alternatives allow habitat to be managed. For purposes of this analysis, species have been grouped as late successional associates, or early successional associates. Some species such as deer and elk are associated with both late and early successional habitat. Both long and short term effects are discussed below.

Alternative A

This alternative allows essentially no habitat manipulation or fuels reduction treatment in either the Diversity Emphasis Area or the Old Growth Emphasis Area. Under this alternative there would be no immediate short term effects to wildlife habitat. In the long term, the continuing problem of increasing fire hazard due to fuels build-up in both early- and late-successional habitats would continue. Also, ecosystem health problems associated with lack of fire or disturbance such as encroachment of conifers into oak woodlands, grasslands and brush fields would continue to degrade these important habitats. The lack of fuels reduction and silvicultural treatments in young and middle aged forest stands would not allow as rapid of tree growth and development of late-successional stand characteristics when compared to the "action" alternatives, especially Alternatives C and D. Because Alternative A allows no treatment in mature stands, the currently observed mortality of large trees due to stand density would continue. Large trees are a significant, key, component of the late-successional habitat in the Monument. The loss of large trees in undesirable. Under this alternative the long-term risk of a large acreage, stand replacing, wildfire would continue to increase. Such a fire would render many acres of both early- and late-successional habitats unsuitable for many years. Any late-successional habitat lost to such a fire could take several centuries to recover to its pre-fire condition.

Alternative B

The long- and short-term effects of this alternative on wildlife are expected to be is very similar to those described under Alternative A except that this alternative allows for the treatment of 3,400 acres of potential late-successional habitat (habitat type 3). These are stands of trees that are currently too young and/or too small to provide late-successional habitat features. Treating these stands and placing them on growth, species composition, and structural diversity pathways to develop into functional late-successional habitat as soon as possible would benefit late-successional associated species in the long-term. The sooner these stands are set up to grow into the desired types of stands, the sooner additional late-successional habitat would be developed. Because these stands currently do not provide late-successional habitat, there would be no negative effects to, or loss of, late-successional habitat resulting from the proposed treatments. Treating these younger stands would also help reduce the fire hazard in the Monument. This alternative allows the least amount of treatment in younger stands of any of the action alternatives, thus it provides the fewest habitat related benefits to late-successional associated species in the long term.

Early-successional associated species would generally not benefit in the short- or long-term under this alternative because this alternative forgoes or defers treatment of early-successional and/or non-conifer habitats except for limited management for control of weeds. As discussed in Chapter 2, much of the habitat in the Diversity Emphasis Area is becoming less suitable for some early-successional associated species due to the lack of fire. Brush fields are becoming decadent and unproductive, oak woodlands are being encroached upon by conifers and brush. This alternative would do nothing to reverse these trends.

Alternative B would allow managers to do the least of any of the action alternatives to address the serious threat that stand replacing fire poses to the wildlife habitats of all kinds in the Monument. If a large, high intensity, fire occurs in the Monument, thousands of acre of many habitat types could be lost all at once.

Alternative C

Alternative C places a high priority on treating stands with high fire hazard ratings that are adjacent to or close to functional late-successional habitat. Some of these stands are currently functioning as dispersal habitat for the Northern Spotted Owl and some are not. Some of these stands have the potential to develop into late-successional habitat and some do not.

Late-successional habitat associated species would benefit long-term as a result of this alternative because 3,185 acres of stands with potential to become late-successional habitat (types 3 and 5) would be treated with that goal in mind. Of these 3,185 acres, approximately 2,346 acres are currently in a small tree/young stand condition that provides no late-successional habitat features (type 3). Treating these 2,346 acres would have no negative effect on late-successional associated species.

The remainder of the 3,185 acres (839 acres) proposed for treatment under this alternative currently has large enough trees and enough canopy closure that it is functional as dispersal habitat for Northern Spotted Owls (habitat type 5) and other species associated late-successional habitat.

The effects of the above treatment in the long-term would be to hasten the development of late-successional characteristics in the younger stands. This would both increase the amount of late-successional habitat on the landscape, and help to create larger blocks of late-successional habitat. The short-term effects of this same treatment would be to reduce the potential threat of a large, intense wildfire destroying functional late-successional habitat in the Monument. By reducing the hazard in the immediate vicinity of the functional late-successional stands, fire suppression forces would have a greater chance of keeping an approaching wildfire out of the late-successional stands. Fuel reduction measures and silvicultural treatments in the type 5 stands mentioned above could temporarily reduce the canopy closure to the point that the stands are no longer functional as dispersal habitat for Northern Spotted Owls. In the worst case scenario that all of the treated habitat type 5 stands were unintentionally rendered unsuitable for Northern Spotted Owl dispersal, there would be a reduction of approximately four percent in the amount of dispersal habitat in the Monument until the canopy in the treated stands returned to approximately forty percent closure.

This alternative allows for fuels hazard reduction treatments in up to 1,770 acres of currently functional late-successional habitat (types 1 and 2). This treatment would occur only in stands that have a high fire risk rating. The 1,770 acre figure represents approximately 15 percent of the functional late-successional habitat in the Monument. These treatments would remove "non-commercial" sized material from the stands which is generally less than 8 inches in diameter. These fuels reduction treatments could have some negative effects on the suitability of the stands in the short-term (5-10 years). However, these treatments would be designed to retain the late-successional characteristics of the stand as much as possible including high canopy closure, snags and down wood. The immediate effects on the overall functionality of the forest stands for late-successional associated species, such as the Northern Spotted Owl, is expected to be minimal. These treatments would be beneficial to late-successional associated species in the long-term because the fire threat to the stands would be reduced and the remaining large/medium sized trees would be healthier because they would have less competition for food, water and sunlight. In the worst case scenario that all of the treated type 1 and 2 stands were unintentionally rendered unsuitable, there would be a loss of approximately fifteen percent of the late-successional habitat in the Monument.

This alternative allows the treatment of 157 acres of habitat type 6. This habitat currently serves as dispersal habitat for spotted owls but has no potential to develop into late-successional habitat due to poor growing site conditions or unfavorable tree species mix. Fuels reduction and silvicultural treatments in these type 6 stands may temporarily reduce the canopy closure to the point where they are no longer functional as dispersal habitat for Northern Spotted Owls. In this worse case scenario, 157 acres of dispersal habitat would be degraded for a period of years until the canopy re-closes to over forty percent. This represents less than one percent of the dispersal habitat in the Monument.

Alternative C also allows the treatment of 2,614 acres of land that has high fire hazard rating and that is currently not providing any late-successional habitat or Northern Spotted Owl dispersal habitat, and does not have the potential to develop late-successional habitat characteristics (type 4). Treating this habitat would have no negative effect on late-successional associated species. Treatment could provide benefits to late-successional associated species by reducing the fire threat to adjacent late successional stands. These stands are usually oak woodlands and brush fields. Early-successional species would benefit from treatments in these stands. Forage availability for a variety of species would be increased, and the loss of early-successional habitat to the process of succession would be slowed. Some of these stands (especially brush fields and grasslands) would essentially be "reset" to an early-successional stage.

Alternative D

This alternative has all the same benefits for late-successional habitat associated species as Alternative C, but provides additional long-term benefits by allowing the treatment of an additional 6,400 acres of habitat type 5. Thus, under this alternative a total of 7,239 acres of habitat type 5 is treatable. This represents 84 percent of the type 5 habitat in the Monument, but only 27 percent of the dispersal habitat in Monument. This treatment would increase the rate of development of late-successional stand characteristics in the treated stands. However, there is a potential short-term cost associated with this long-term benefit. Habitat type 5 is suitable for Northern Spotted Owl dispersal but not for nesting, roosting, or foraging. Treating these stands would put them on the trajectory to become roosting, foraging and potentially even nesting habitat in the future, but in some stands treatment could reduce or eliminate their effectiveness as dispersal habitat in the short-term (for up to approximately 20 years after treatment). In the worst case scenario of all of the treated type 5 acres becoming unsuitable for Northern Spotted Owl dispersal, 27 percent of the current dispersal habitat would be degraded for a number of years. Treating this additional acres would reduce the fuels hazard on 6,400 acres above the acreage proposed for treatment in Alternative C. The benefits to wildlife of treating hazardous fuels have been discussed under the alternatives above.

Alternative D would allow commercial sized trees to be cut on approximately 1,770 acres of habitat type 1 and 2 stands. This treatment would occur only if the stands have a high fire risk rating (the same type1 and 2 stands proposed for non commercial treatment in Alternative C) . The 1,770 acre figure represents approximately 15 percent of the functional late-successional habitat in the Monument. This would result in a decrease in habitat quality in the short-term due to loss of canopy closure and stand complexity. The commercial thinning harvest proposed is very modest and would leave the stands in an essentially intact condition, however, to achieve the desired long-term stand development and fire protection, there would have to be some noticeable alteration of the stand structure in the mid-story. This would negatively affect the suitability of the stands in the short-term for late-successional associated species such as the Northern Spotted Owl and Northern Goshawk. The degree of degradation resulting from this treatment is impossible to assess at this time because it depends on the condition of each stand pre-treatment and on the treatment prescription that is applied. Worst case scenario would be the short-term degradation of approximately 15 percent of the currently functional late-successional habitat in the Monument. If these stands were degraded to the point that they did not function as late-successional habitat, they would likely still function as Northern Spotted Owl dispersal habitat.

Alternative D is expected to result in the same effects to early-successional habitat associated species as Alternative C. As Alternative D allows a broader variety of mechanized treatment tools, particularly in the oak woodlands and brush fields, than do the other alternatives, the probability of actually treating the proposed acreage discussed above is higher than under the other alternatives. Mechanized treatments are generally cheaper and faster and thus easier to implement.

Table 4-13 displays the habitat parameters likely to be affected by each activity, and how the habitat would likely be affected.

Table 4-13. Affects of Proposed Alternatives on Terrestrial Wildlife in the Monument

Activities With Potential for Affecting Changes in Habitat Quality	Habitat Parameters Likely to be Affected	Potential Changes in Habitat Parameters
Commercial Timber Harvest (Silvicultural Thinning)	1. Canopy Closure 2. Stand Structural Diversity 3. Stand Species mix 4. Snag Density 5. Down wood 6. Sound/Noise 7. Stand Density 8. Microclimate 9. Weeds 10. New roads	1. Timber harvest/silvicultural thinning can reduce canopy closure. 2. Timber harvest/silvicultural thinning can reduce stand structural diversity in both the short and long term. Timber harvest can increase stand structural diversity in the long term. 3. Timber harvest/silvicultural thinning can alter stand species mix. 4. Timber harvest/silvicultural thinning can reduce snag density both short and long term. 5. Timber harvest/silvicultural thinning can reduce the availability of down wood both short and long term. Timber harvest can increase the availability of down wood both short and long term. 6. Timber harvest/silvicultural thinning can increase noise disturbance in the short term. 7. Timber harvest/silvicultural thinning alters the density of stands. 8. Timber harvest/silvicultural thinning can alter the microclimate in stands. 9. Seeds of non-native invading plants can be carried into new areas by logging equipment. These invaders can propagate in disturbed areas created by logging equipment. 10. Timber harvest/silvicultural thinning often involves new road construction. (see roads below)

Table 4-13. Effects of Proposed Alternatives on Terrestrial Wildlife in the Monument

Activities With Potential for Affecting Changes in Habitat Quality	Habitat Parameters Likely to be Affected	Potential Changes in Habitat Parameters
Roads	1. Direct impacts (eg. vehicles killing animals). 2. Security/Hiding Cover 3. Dispersal suitability 4. Vegetation 5. Competition with non-native species. 6. Snags	1. Open roads provide vehicle access into wildlife habitat. Vehicles hit and kill wildlife. 2. Open roads provide humans access into otherwise relatively undisturbed habitats. 3. Roads can present barriers (either real or perceived) to some species of wildlife. 4. Invading plants can spread into new areas by propagating along road-side disturbed areas. 5. Non-native animals such often use roads as travel routes to access new areas. 6. Snags and trees with structural defects along roads are often removed officially as hazards or unofficially by firewood cutters.
Prescribed fire	1. Canopy closure 2. Vegetation 3. Snags 4. Down wood 5. Stand Species Mix 6. Hiding cover for small mammals 7. Brush/grass habitat condition 8. Direct loss of Wildlife	1. Prescribed fire can reduce canopy closure in the understory and/or over story. 2. Prescribed fire can alter the herbaceous layer species composition and density. 3. Snags can be lost (burned up or felled) during prescribed burns. Snags can be created by prescribed burns. 4. Prescribed fire can result in loss of down wood in the short term. Prescribed fire can result in mid and long term increases in down wood. 5. Repeated use of prescribed fire can result in long term shifts in stand species composition. 6. Prescribed fire can remove tall grass and brush 7. Prescribed fire can rejuvenate grass/brush habitats 8. Prescribed fire can kill wildlife

Table 4-13. Affects of Proposed Alternatives on Terrestrial Wildlife in the Monument

Activities With Potential for Affecting Changes in Habitat Quality	Habitat Parameters Likely to be Affected	Potential Changes in Habitat Parameters
Wildfire Suppression Operations	1. Snags 2. Weeds 3. New Trails 4. Habitat mix at the landscape level 5. Protection of wildlife from direct loss	1. Snags can be lost when felled as hazards. 2. Seeds of non-native invading plants can be carried into new areas by fire fighting equipment. These invaders can propagate in disturbed areas created by firefighting equipment. 3. Fire control lines can become unofficial OHV trails. (See OHV use above) 4. Wildlife suppression can maintain the current habitats on the landscape in the short term by minimizing loss to wildfire. Wildfire suppression disrupts the disturbance process that is essential for maintenance of some habitat types in the long term. 5. Wildfire can kill wildlife

It would be impractical to analyze the effects of each alternative on each species of wildlife known or suspected to occur in the Monument. For purposes of comparison between the alternatives, the sensitive and special interest species known or suspected to occur in the Monument analysis area are the focus of the effects analysis for wildlife. The Special Status Species (SSS) list represents a wide variety of habitat needs. In this analysis these species serve as partial surrogates for other more common species.

Table 4-14 provides a comparison of the expected effects of the action alternatives on the special status and special interest species known or suspected to occur in the Monument. Alternative A is the no action alternative which would continue current interim management under the 1995 Medford District Resource Management Plan and the Presidential Proclamation. This is the baseline to which the three action alternatives are compared. Table 4-14 summarizes the overall effect that Alternatives B, C, and D are expected to have on the special status and special interest species in the Monument, not on the species as a whole across the entire species range. The alternatives are complex and in some cases one component of an alternative may be beneficial for a species and another component of the same alternative could be detrimental to the same species. Table 4-14 summarizes the overall effect each alternative is expected to have on a particular species considering all of the provisions of each alternative. All indications in the table that an alternative is beneficial or detrimental to a species are relative to the expected effects of Alternative A.

Table 4-14. Special Status and Special Interest Species Comparison of Effects of the Proposed Action Alternatives to the No Action Alternative

Species Affected	Alt. B	Alt. C	Alt. D	Main factor(s) for ratings
		Birds		
Bald Eagle	=	+	–	•Increased human disturbance at Hyatt Lake and along Jenny Creek (-) • Increased habitat protection through fire hazard reduction (+)
Peregrine Falcon	=	=	=	•Increased human disturbance at nest site (=)
Lewis Woodpecker	–	+	+	•Active maintenance of oak savannah habitat (+) •Loss of oak savanna habitat due to conifer/brush encroachment (-)
Greater Sandhill Crane	=	=	–	•Increased human disturbance at nesting/feeding wetlands (-)
Western Meadowlark	=	+	+	•Restoration of tall grass habitats in meadows (+)
Western Bluebird	=	=	=	•Snag retention/creation (=)
White Pelican	=	=	=	•No effects anticipated (=)
Northern Spotted Owl	–	+	+ +	•Increased habitat protection through fire hazard reduction (+) •Development of more habitat faster (+) •Minimal young stand improvement or fire hazard reduction (-)
Golden Eagle	+	+ +	+ +	•Increased habitat protection through fire hazard reduction (+)
Northern Goshawk	+	+ +	+ +	•Increased habitat protection through fire hazard reduction (+)
Great Gray Owl	+	+ +	+ +	•Increased habitat protection through fire hazard reduction (+)
White- Headed Woodpecker	+	+ +	+ +	•Snag retention/creation (+)
Black-backed Woodpecker	+	+ +	+ +	•Snag retention/creation (+)
Northern Three-toed Woodpecker	+	+ +	+ +	•Snag retention/creation (+)
Pileated Woodpecker	+	+ +	+ +	•Snag retention/creation (+)
Flammulated Owl	+	+ +	+ +	•Snag retention/creation (+)

Table 4-14. Special Status and Special Interest Species Comparison of Effects of the Proposed Action Alternatives to the No Action Alternative

Species Affected	Alt. B	Alt. C	Alt. D	Main factor(s) for ratings
Reptiles and Amphibians				
Western Pond Turtle	=	+ +	+	•Riparian zone protection (=) •Collection/harassment by additional visitors (-) •Habitat protection from fire hazard reduction (+)
Cascade Frog	+	+ +	+ +	•Habitat protection through fuels hazard reduction (+) •Riparian zone protection (+)
Mammals				
Fisher	+	+	+ +	•Late-Successional habitat development and protection from fire (+)
American Marten	+	+	+ +	•Late-Successional habitat development and protection from fire (+)
Pacific Pallid Bat	+	+	+	•Snag retention/creation (+)
Townsend's Big-Eared Bat	=	=	=	•No change
Terrestrial Mollusks (slugs and land snails)				
Helminthoglypta hertleini	+	+ +	+	•Habitat protection through fuels hazard reduction w/ minimal surface disturbance (+) •Alt. C reduces fuel hazard without heavy equipment(++) •Alt. D reduces more fuel hazard but disturbs more ground with heavy equipment (+)
Monadenia Chaceana	+	+ +	+	•Habitat protection through fuels hazard reduction w/ minimal surface disturbance (+) •Alt. C reduces fuel hazard without heavy equipment(++) •Alt. D reduces more fuel hazard but disturbs more ground with heavy equipment (+)
Trilobopsis tehemana	+	+ +	+	•Habitat protection through fuels hazard reduction w/ minimal surface disturbance (+) •Alt. C reduces fuel hazard without heavy equipment(++) •Alt. D reduces more fuel hazard but disturbs more ground with heavy equipment (+)

Table 4-14. Special Status and Special Interest Species Comparison of Effects of the Proposed Action Alternatives to the No Action Alternative

Species Affected	Alt. B	Alt. C	Alt. D	Main factor(s) for ratings
Special Interest Species				
Klamath Mardon Skipper (butterfly)	=	=	=	•Fencing cattle out of occupied meadow habitat(=)
Black-tailed Deer	+	+ +	+ +	•Habitat improvement through prescribed fire (+)
Roosevelt Elk	+	+ +	+ +	•Habitat improvement through prescribed fire(+)

= : Expected effects of this alternative are identical or very similar to those of the baseline alternative (A).
+ : Expected effects of this alternative are beneficial above the conditions provide by the baseline alternative.
+ + : Expected effects of this alternative are beneficial above the conditions provide by the baseline alternative, and better than other alternatives marked with a single "+".
− : Expected effects of this alternative are more detrimental to the species than those expected under the baseline alternative.
* Some short-term reduction in habitat suitability but long term gains in same.

Summary of Effects on Terrestrial Wildlife

Table 4-15 was developed by tallying the scores for each alternative by species in Table 4-14. The score codes for each species for each alternative in Table 4-15 are relative to the baseline of Alternative A. Alternative C appears to offer the best, most balanced mix of habitat protection and enhancement for terrestrial wildlife in the Monument.

Table 4-15. Summary of Effects on Terrestrial Wildlife of Proposed Alternatives

	Alternative B	Alternative C	Alternative D
Number of "++" species	0	16	14
Number of "+" species	18	7	8
Number of "-" species	2	0	2
Number of "=" species	8	5	4
Total number of positives scores (++ and +) *	18	39	36
Total number of negative scores (-) *	2	0	2
Total score for alternative (total +'s) - (total -'s)	16	39	34

* Scores of "++" count for 2 here. For example, an alternative with 10 species scored as "++" would get 20 points for those species (two pluses times 10 species).

Vegetation

Diversity Emphasis Area

This analysis considers an ability to manage the Diversity Emphasis Area towards a desired future condition identified by each management/ecological objective implicit within the following headings and descriptions within Table 4-16. Most grass/shrub/woodland plant communities of the Diversity Emphasis Area are subject to livestock impact. This analysis does not determine the impacts of livestock on biological elements of the landscape. It is assumed that grazing will be maintained within the CSNM while their impacts to the biological elements and physical environment of the Monument are determined by the livestock grazing impact study. If impacts are identified that can't be mitigated by altering grazing management practices then livestock grazing would be eliminated from the Monument.

Grasslands

Maintain and Protect Existing Native Grasslands

Most grasslands are disturbance mediated. Since healthy grasslands are the first defense against weed invasions, it follows that an ability to use appropriate management tools (principally fire) is critical for maintenance of healthy herbaceous plants communities. Alternatives A and B do not allow the development of a fire maintenance program that would lower the fire hazard. Alternatives C and D are thus considered more appropriate for grassland maintenance. Prescribed fire is also a useful tool in former grasslands currently invaded by shrubs.

A considerable area of the Monument likely subject to historical fire is not appropriate for prescribed fire due to patterns of land ownership, the combination of excessive fuels, topographic position, and danger imposed on other important biological elements. In such cases manual or mechanical treatment methods may be useful for the restoration of grassland communities. While mechanical treatments may expedite (due to relative cost efficiency) treatment of shrub invaded areas, the negative consequences of soil surface disturbance, possible introduction of weeds, and a likely inability to garner sufficient materials for re-vegetation (for example, native grass seed) favor slower techniques more easily tailored to site specific conditions. Alternative C is thus considered more appropriate than Alternative D.

Improve Native Grass/annual Grass Mix to Native Grass Domination

Non-native annual grass invasion within the CSNM is likely to continue (albeit at different rates) regardless of future livestock management. Few tools exist to treat the extensive areas where non-native grasses are a component of grasslands. In the following order of priority, carefully timed applications of prescribed fire, defoliation treatments, and herbicides could favor the native herbaceous component. Alternatives A and B offer none of these tools. Alternatives C and D offer the ability to use prescribed fire, defoliation treatments, and herbicides. However, Alternative C precludes the use of tractor mounted implements (for example, mowers) likely affecting the ability to treat large areas sequentially for 2 or 3 years. Alternative D is thus favored over Alternative C.

Restore Annual Grass Monoculture to Native Grass Domination

The literature identifies the extreme difficulty of converting annual grass plant communities back to native herbaceous domination. Successful conversion may rely on the full suite of tools (Alternative D) applied for 2 or 3 consecutive years in order to treat the broader landscape (see literature review, Appendix GG). Alternative D would best facilitate the restoration of native grasses.

Shrublands

Recreate a Range of Wedgeleaf Ceanothus Stand Ages Across the Landscape

Because of the fire-dependence of seed for germination, prescribed fire is the primary tool whereby wedgeleaf ceanothus shrublands can be rejuvenated. The use of fire is also critical for returning nutrients to the soil to facilitate vigorous growth by both shrubs and associated herbaceous species. In some areas of the landscape, the high fuel-loading may prevent the application of prescribed fire without extensive hand or mechanical treatments. Alternatives C and D are thus favored over Alternatives A and B. Alternative D is favored over Alternative C only in terms of relative cost. Alternative C may allow mor [illegible] specific treatment and allow the use of harvested materials for restoration purposes. The careful placement of burn-piles on patches of weeds and the consequent growth of annual weeds may be an important component of management. The utilization of woody material for ameliorating growth conditions (for example, shading, or mulch) or for manipulating available nitrogen is also an important management consideration. The ability to achieve such micro-site requirements favors Alternative C over Alternative D.

Woodlands

Reduce Conifer Invasion

Conifer invasion is likely to continue under Alternatives A and B resulting in the further loss of mesic Oregon white oak woodlands and black oak dominated plant communities. Fire, manual treatments and mechanical treatments (in this order of priority) favor Alternatives C and D. Large machinery proposed in Alternative D would damage desired "leave trees". Alternative C is thus favored over Alternative D.

Reduce Shrub Invasion

Drier Oregon white oak communities are susceptible shrub invasion. While shrubs are a natural component of such woodlands, the current accumulation of fuels as a result of past fire-suppression could result in fires with characteristics different from historical fire events. This trend of increasing fuels leading to undesired fire intensities is likely to continue under Alternatives A and B. Since the drier shrub invaded oak woodland communities are also subject to annual grass invasion, the ability to achieve micro-site objectives are more attainable through Alternative C than Alternative D.

Reduce Loss of 'Open Oak Savanna' Communities

Many of the Oregon white oak stands have become more crowded. The former interspaces between largest and oldest individual oaks have filled in with a younger cohort of oak saplings. In historical times, fire thinned out such stands to maintain a more open environment. The effects of fire-suppression are likely to continue under Alternatives A and B. Fire and manual thinning are the desired tools to use since oak woodlands are easily invaded by annuals once the soil surface is disturbed. Large tractor mounted machinery permissible under Alternative D may disturb soil and distribute weed seed while also damaging existing trees. Alternative C best protects and enhances these communities.

Wetlands, Riparian Vegetation, Floodplains, Springs and Seeps

Facilitate Wetland and Riparian Plant Recovery

Refer to hydrology and riparian sections

Repair of Hydrological Functioning

Refer to hydrology and riparian sections

Re-establishment of Riparian Woody Vegetation

Refer to hydrology and riparian sections

Repair of Ponds and Pump Chances

Refer to hydrology and riparian sections

Restore Hardwood Floodplain

The drier portions of floodplains dominated by Oregon white oak have been targeted for conversion to pasture in the past. This site domination by grasses and weeds provide an efficient competitive barrier to the establishment of woody species. Restoration of these sites (particularly on the former Box-O Ranch) would be facilitated by using a tractor mounted auger (Alternative D) allowing young trees to easily penetrate the clay layer common to the area. Alternative C provides for the use of hand-tools to achieve the same objectives. Without these restoration aides (Alternatives A and B), the non-native grass dominated pastures are likely to impede the establishment of native woody species outside of riparian areas.

Landscape Values and Processes

Visitor Impact

The establishment of the CSNM is likely to increase the number of visitors to the area. While visitor impact will be ameliorated through careful planning, any encouragement of visitation will be detrimental to certain plant communities. At most risk are specialized plant communities found on rocky outcrops which generally provide the best vistas of the Monument and surrounding lands. Other interesting plant communities (bogs, rocky meadows, springs, etc.) may also be damaged as their locations become known. Damage (trampling) already apparent at several rocky view sites will be slow to recover under the most favorable circumstances (zero visitation) and unlikely to occur under any of the alternatives presented in this Plan. Alternatives C and D would encourage visitation thereby increasing damage to these biological resources.

Counteract Noxious (and other) Weed Invasion

While noxious weed control is common to all alternatives, such direct weed control fails to address the fact that the maintenance of healthy native plant communities is the first barrier to weed invasion. The inability to use prescribed fire under Alternatives A and B is likely to favor increased rated of weed invasion as a landscape process. The use of heavy equipment (Alternative D) increase risk of spreading noxious weeds, therefore, Alternative C is preferred.

Maintain/Improve Plant Community Richness

Alternatives C and D allow for a landscape perspective in the management of the CSNM. Only by looking at the landscape as a whole are managers likely to recognize patterns of plant community change (succession) under the varied forces of fire use/ suppression, weed invasion, livestock grazing, and others. Only Alternatives C and D allow the judicial application of prescribed fire (and other management tools) to maintain plant community richness across the landscape.

Maintain/Improve Plant Community Balance of Conditions

Plant communities are dynamic, implying that each plant community can occupy a range of conditions. Maintaining such a range of conditions is critical for the maintenance of ephemeral plant and wildlife species with specific and restricted habitat requirements. It is unlikely that hands-off management will solve many of the ecological issues arising from the deleterious effects of past management (timber harvest, fire-suppression, grazing). Alternatives A and B do not provide the necessary tools to recreate the range of conditions historically associated with the plant communities of the CSNM. These tools are provided by Alternatives C and D, though only Alternative D could hope to achieve landscape management objectives as defined in this Plan.

Reintroduce Fire as an Ecosystem Process

Many plant species of the CSNM are considered directly or indirectly dependent on fire for their persistence on the landscape. Species directly dependent on fire need the heat and products of combustion to facilitate germination, establishment, and growth. Removal of woody vegetation provides more open environments for those plant species unable to compete for water or sunlight against deeper rooted and larger statured woody plant species. The action of fire provides a range of conditions within any particular plant community. The high species richness of the Monument is due in part to the effects of historical fire. Without the use of prescribed fire, the Monument will continue to lose native plant species and plant communities (Alternatives A and B). Of the alternatives that promote the use of prescribed fire as a management tool (Alternatives C and D), Alternative D is favored since it would provide a better probability of attaining defined management goals by allowing the use of heavy equipment to facilitate the application of prescribed fire.

Protect/Maintain Biological Elements for Which the Monument Was Proclaimed

The biological elements protected by the Monument range from individual species (plant and wildlife), plant communities, varied habitat, to aspects of ecosystem functioning and integrity. These components of an ecosystem can only be protected in the longer term by recognizing the role of ecosystem processes (such as fire, succession, weed invasion, herbivory) and using the full range of management tools to ensure the maintenance of the biological elements of importance within a desired range of conditions. This perspective of responsibility and full access to all management tools is best expressed by Alternative D. Alternatives A and B place too many restrictions on management, while Alternative C falls short of Alternative D by restricting the appropriate use of heavy equipment. The use of machinery may allow the reintroduction of fire to re-create habitats lost as a result of past fire suppression activities while also faciliting the reintroduction of weeds. Alternative D is defined as most appropriate for the maintenance of those biological elements for which the Monument was proclaimed only insofar as appropriate use is made of tools allowed by Alternative D following the successful completion of pilot studies.

Table 4-16. Summary of Grass/Shrub/Woodland Plant Community Condition Trends by Alternative.

Management Objective and Conditions	A	B	C	D
Grasslands				
Maintain and Protect Existing Native Grasslands:	D	D	I+	I
Improve Native Grass/annual Grass Mix to Native Grass Domination:	D	D	I	I+
Restore Annual Grass Monoculture to Native Grass Domination:	D	D	I	I+
Shrublands				
Recreate a Range of Wedgeleaf Ceanothus Stand Ages Across the Landscape:	D	D	I+	I
Woodlands				
Reduce Conifer Invasion:	D	D	I+	I
Reduce Shrub Invasion:	D	D	I+	I
Reduce Loss of 'Open Oak Savanna' Communities:	D	D	I+	I
Wetlands, Riparian Vegetation, Floodplains, Springs and Seeps				
Facilitate Wetland and Riparian Plant Recovery:	refer to hydrology and riparian sections			
Repair of Hydrological Functioning:				
Re-establishment of Riparian Woody Vegetation:				
Repair of Ponds and Pump Chances:				
Restore Hardwood Floodplain:	U	U	I	I+
Landscape Values & Processes				
Visitor impact:	D+	D+	D	D
Counteract Noxious Weed Invasion:	U	U	I+	I
Maintain/Improve Plant Community Richness:	D	D	I	I
Maintain/Improve Plant Community Balance of Conditions	D	D	I	I+
Reintroduce Fire as an Ecosystem Process:	D	D	I	I+
Protect/maintain Biological Elements for Which the Monument Was Proclaimed:	D	D	I	I+

I = improve D = decline U= unaffected - = small change + = large change

Forest Health (Old-Growth Emphasis Area)

All of the coniferous forest lands within the Monument were grouped into the Old-Growth Emphasis Area (OGEA). These lands are either currently habitat for late-successional and old-growth (LSOG) dependant species (habitat types 1 and 2) or are capable becoming LSOG habitats in the future (habitat types 3 and 5). This analysis will evaluate how well each proposed alternative will accomplish the goal of protecting and maintaining forest stands currently providing LSOG habitat while enhancing other coniferous forest stands towards LSOG habitat. For a description of current and potential LSOG habitat types refer to the wildlife section in Chapter 2.

Alternative A

Alternative A is interim management and no active management actions would occur on forest lands. This alternative will be used as a baseline to evaluate the effects of the other proposed alternatives.

Recent surveys and stand exams indicate continued ingrowth of white fir and Douglas-fir in many forest stands of LSOG habitat types 1 and 2 (see Appendix T, Tables AT-1, AT-2, AT-3). This establishes a trend of fine fuels, small tree densities, small basal area and large tree mortality continuing to increase throughout all physiographic ecoregions. This phenomenon is particularly noticeable in un-entered LSOG habitat types 1 and 2 that have had little or no disturbance for the past century. Small trees aged by diameter class have confirmed continued ingrowth and increases in stocking levels throughout this time. This ingrowth is accompanied by small tree mortality during the stem exclusion phase that is presently occurring as well. At some point, stem exclusion in white fir understory is likely to be similar to ingrowth indicating a limit to stocking density levels of white fir. At the same time the continuing mortality will likely contribute increased fuel loading. Most of this will result in the accumulation of fine fuels that do not contribute large coarse woody debris (CWD) to forest stands but instead increase the wildfire hazard. Some large CWD will occur through large tree mortality. Replacement for large trees will likely be white fir and Douglas-fir.

Habitat type 3 stands will develop into dense slow growing and fire prone stands of pine or mixed conifer. Even-aged pine plantations which currently comprise the majority of habitat type 3 lands will be at increasingly high risks to bark beetle as basal areas increase without thinning. In some cases, problems symptomatic of overly dense, stressed pine will appear as trees grow. Needle blights, shoot moths and shoestring root rot are examples of potential problems. Some gaps and ingrowth typical of mixed conifer species will occur. These species will grow slowly and will have to contend with fuels buildup of existing overstory pine. Fire hazard will then increase over time further increasing risk to adjacent habitat type 1 & 2 stands. The mixed conifer stands in habitat type 3 would also grow slowly and be overly dense. The likelihood of major beetle infestation and other diseases would be less than in the pine plantations. These stands would develop into mid-seral stands with mixed conifer character that in most cases would not become LSOG habitat 1 or 2 due to high densities. These stands are currently very dense and clumpy because they are usually advance reproduction left after all the overstory was removed and/or clearcutting occurred. White fir is often the dominant species in these mixed stands.

Habitat type 5 forest stands will grow slowly within residual groups of larger trees left from previous logging. Gaps will become occupied over time with a variety of species resulting in a multi-aged canopied structured stands. However, because white fir was usually the species left after logging it will more commonly be the dominant species on site for the foreseeable future. These stands will then tend to stagnate due to dense stocking levels of white fir. They will be more susceptible to catastrophic stand replacement events as fire dependent species of pine and Douglas-fir become less common.

Alternative B

Habitat types 1, 2 and 5 will develop as in alternative A because no treatments will occur under Alternative B in these habitat types.

Ninety percent of habitat type 3 would be thinned over the first decade. These are generally the young tree stands that have minimal overstory component. Selection of favored trees would accelerate growth and increase the amounts of preferred conifer species in these stands. It is thought that reduced densities would mimic, or at least approach, the stocking levels of young stands that developed into LSOG forests in the past. Pine plantation stand densities would be thinned to a level that would decrease fuels and risk to beetle attack. More open grown pine would have the character needed for LSOG structure such as large branches. Lower densities in the pine plantations would allow ingrowth of natural reproduction or underplanting of other conifer species where desirable. Thinning mixed conifer stands would again allow for the selection of fire dependent species and provide an opportunity to remove white fir from these stands.

The thinned stands would become habitat type 2 in a few decades. These treatments would reduce the fuel loading in the treatment area and, as a result, overall catastrophic fire events would be less likely. Currently, some of these stands have a portion of their stocking in commercial sized trees. The option to thin commercially at the preferred spacing would not be allowed in this alternative.

Alternative C

Fifteen percent of habitat types 1 and 2 would be thinned noncommercially and underburned. Ninety percent of white fir less than 6" in dbh would be thinned or burned. About twenty-five percent of the white fir presently in the stand greater than 6" dbh and up to 20" in dbh would be thinned or lost during prescribed burning. See Appendix T (Tables AT-1, AT-2, AT-3) for current stand tables in habitat types 1 and 2. Table 4-19 shows estimated timber volume that may be harvested due to protection treatments. The effects of burning and thinning would not reduce canopy cover, but would reduce lower layers of canopy. Most treatments would involve thinning of small material, pile burning and then broadcast burning. Pre-treatment of fuels prior to broadcast burning is required because ninety years of fire suppression has resulted in such heavy accumulations of fine fuels that objectives could not reasonably be met otherwise.

Habitat type 3 would be treated similarly to Alternative B, but only sixty-two percent would be thinned. Additionally, commercial sized trees would be thinned where applicable resulting in slightly lower stocking levels and removal of material from the site. This alternative would allow removal of commercial size trees from otherwise overstocked groups of larger trees found within habitat type 3. The other affects from treatment would also be similar to Alternative B.

Approximately 839 acres of habitat type 5 would be commercially and/or non-commercially thinned. Groups of dense trees would be thinned from below. Most of the trees removed would be white fir less than 10" in dbh. Some trees up to 20" in diameter would be thinned in order to release preferred species. The thinning across these stands would be highly variable given the current structure of forest stands in this habitat type. Growth within these groups would be accelerated. Pine, incense cedar and Douglas-fir would increase while white fir decreases. Ladder fuels would be reduced thus lowering the risk of catastrophic wildfire in the treated units.

Alternative D

Fifteen percent of habitat types 1 and 2 would be thinned commercially and/or non-commercially as in Alternative C. In addition selected thinning would occur where dense groups of white fir and Douglas-fir are acting as ladder fuels growing next to dominant trees. A byproduct of the protection thinning would be a likely increase in tree vigor of dominant Douglas-fir and pine. Some gaps would be created allowing for establishment of these less shade-tolerant species. The additional thinning in this alternative would occur in created gaps and around preferred dominant pine.

Habitat type 3 acreage would be treated as in Alternative C except that thinning would be heavier in older natural stands.

Habitat type 5 would be thinned similarly to Alternative C except that much more (approximately 7,239) acreage would be thinned.

Table 4-17 identifies the affects of the proposed alternatives on key structural characteristics and species composition of the coniferous forest in the Monument.

Table 4-17. Affects of Proposed Alternatives on Forest Structural Characteristics and Species Composition(trends)

Forest Structural Characteristics		**A**	**B**	**C**	**D**
Stand Density		I	I	D	D
Canopy Cover		I	U	I	I
Individual tree vigor		D	D	I	I
Average Tree size (Diameter and height)		D	D	I	I
Coarse Woody Debris	Large > 16"	U	D	I	I
Coarse Woody Debris	Small < 16"	I	I	D	D
Snags	Large > 16"	U	D	I	I
Snags	Small < 16"	I	I	D	D
Dwarf Mistletoe (not a disease that is considered a disturbance agent, but is important wildlife habitat at a stand structural level)		I	I	U	U

Species Composition	**A**	**B**	**C**	**D**
Ponderosa pine	D	D	I	I
Sugar pine	D	D	I	I
Douglas-fir	D	D	D	U
Incense cedar	U	I	U	U
White Fir	I	I	D	D
Hardwoods	I	I	D	U

I = increase D = Decrease U = Unaffected

Relative Trends for Disturbance Agents

Assumptions made for disturbance agent effects are based on the degree to which activities such as thinning and prescribed burning will occur. Stand structural characteristics change in response to disturbance agents and also determine to what extent a disturbance agent may alter stand development. For instance, lower densities in natural stands generally will result in lower levels of mortality due to beetles. In addition, species composition will determine the extent to which host specific root rots effect future stand development. Often beetle-pathogen interactions occur together and are affected by density and species composition. Fir engraver/root rot interactions are common in the CSNM particularly in white fir plant communities and the more mesic higher elevation mixed conifer forest communities where white fir is found. Most of the assumptions pertain to mixed conifer because mixed conifer plant communities make up approximately ninety percent of the conifer forest types found in CSNM while white fir accounts for about ten percent (Table 2-18).

Small tree thinning and prescribed burning will be the primary management activities applied across the landscape that will affect forest structure and species composition. Generally, lower stand densities and larger tree size will accompany a shift away from small dense white fir toward larger ponderosa and sugar pine while maintaining other coniferous and hardwood species present. This "species shift" will be toward historic compositions. Specifically, historic forest community attributes and current land designations will drive management decisions. Overall trends indicated in the table below are landscape level trends, but are most applicable to actual individual stand treatments proposed. The limited management activities accomplished during the first decade would likely have little overall effect at the landscape level with the exception of Alternative D.

Table 4-18 summarizes the affects of the proposed alternatives on the disturbance agent trends.

Table 4-18. Affects of Proposed Alternatives on Disturbance Agents Trends in Coniferous Forest Stands

Disturbance Agents		A	B	C	D
Laminated Root Rot	(*Phellinus weirii*)	I	I	D	D
Annosus Root Rot	(*Heterobasidion annosum*)	I	U	D	D
Shoestring Root Rot	(*Armellaria mellea*)	I	I	D	D
White Pine Blister Rust Not normally considered a disturbance agent, but listed here due to it's impact on seedling and pole size sugar pine (i.e. young sugar pine are being lost from the stand and being replaced by white fir, Douglas-fir and incense cedar in mixed conifer stands).	(*Cronartium ribicola*)	I	I	D	D
Fir Engraver	(*Scolytus ventalis*)	I	I	D	D
Western Pine Beetle	(*Dendroctonus brevicomis*)	I	I	D	D
Mountain Pine Beetle	(*Dendroctonus ponderosae*)	I	I	D	D
Wind (windthrow resulting in tree mortality)		I	I	D	D
Wildfire (stand replacing events and tree mortality) **With Prescribed Burning implemented**		I	I	D	D

I = increase D = Decrease U = Unaffected

Not normally considered a disturbance agent, but listed here due to it's impact on seedling and pole size sugar pine (i.e. young sugar pine are being lost from the stand and being replaced by white fir, Douglas-fir and incense cedar in mixed conifer stands).

Potential Timber Volume Yields as a result of Commercial Thinning

Prior to the Presidential Proclamation, about 2,256 acres now in the Monument were in commercial based forest land that contributed to the BLM's Medford District Probable Sale Quantity (PSQ). The annual board foot volume harvest toward the PSQ was approximately 46 million board feet (MMBF), (or 460 thousand board feet (MBF) over a ten year period). This volume was based on the harvest scheduling model, TRIM Plus used by the Medford District to calculate it's PSQ.

Table 4-19 indicates potential levels of harvest, by alternative, on lands to be thinned for LSOG habitat protection over a ten year period. Alternative C and D harvest levels within the OGEA could exceed volume that previously contributed to the PSQ. This is

Table 4-19. Estimation of Possible Timber Volume Harvested in the CSNM under the Proposed Alternatives

Habitat Type	Existing Average Volume/Acre	Volume to be Removed	Potential Acres to be harvested	Total volume to be removed over a 10 year period
Alternative A				
1 & 2	37 MBF	0	0	0
3	6.8 MBF	0	0	0
5	28.4 MBF	0	0	0
Alternative B				
1 & 2	37 MBF	0	0	0
3	6.8 MBF	0	0	0
5	28.4 MBF	0	0	0
Alternative C				
1 & 2	37 MBF	0	0	0
3	6.8 MBF	0.5 MBF	2,346	1.2 MMBF
5	28.4 MBF	4.0 MBF	839	3.4 MMBF
Total			3,185	4.5 MMBF
Alternative D				
1 & 2	37 MBF	1.5 MBF	1,770	2.7 MMBF
3	6.8 MBF	1.0 MBF	2,346	2.4 MMBF
5	28.4 MBF	4.0 MBF	7,239	28.9 MMBF
Total			11,355	33.9 MMBF

MMBF = 1,000,000 bd. ft. MBF = 1,000 bd. ft.

due to more acres of potential treatment on a larger land base. The volume levels expected to be harvested are not projected goals, rather they are potential by-products of activities designed to protect and maintain LSOG habitat. Most of the volume removed would be commercial sized small diameter white fir and Douglas-fir.

Special Forest Products

Alternative A and B

It is thought that overall few affects on most products would be noted overall. Mushrooms in general would likely increase because no picking would occur. Again the affects of annual picking is unknown.

Alternative C and D

Availability of firewood would increase due to thinning activities because material would be made available in log decks and slash piles. However much of the material would be white fir which is not preferred firewood. Affects on other commodities is thought to be negligible.

Bureau Special Status Plants (Rare Plants)

Bureau Special Status Plants include species that are also designated as the Monument Survey and Manage plants (see Appendix Z). The term 'rare plants' refers here to all Bureau Special Status, Monument Survey and Manage vascular plants, bryophytes (mosses and liverworts), lichens, and fungi. It also includes the federally listed endangered plant Gentner's fritillary (*Fritillaria gentneri*).

Much of the area within the National Monument has not had rare plant surveys, so presence is assumed in communities capable of supporting rare plants. The prediction of effects is based on proposed management actions at the landscape level in the different alternatives; spatially explicit treatment areas are not known at this time.

Occurrences of rare plants are documented in grasslands, chaparral, oak woodlands, conifer communities, rocky openings, vernal pools, seeps, and riparian areas (see Chapter 2). Many of these communities are not discrete elements on the landscape. Open grasslands, chaparral and oak woodlands, and conifer communities can blend into a mosaic on the landscape, providing a diversity of habitats for groups of rare plants. Rare plant species have different affinities for certain habitats. Some species are known for fairly specific habitats, like California milkvetch (*Astragalus californicus*) that is known only for open grasslands. The rare fungi *Pithya vulgaris*, and *Bondarzewia montana* are known only for conifer communities. *Pithya vulgaris* strictly occurs on recently downed needles on small branches of white fir. Coralseed allocarya (*Plagiobothrys figuratus* spp. *corallicarpus*) is known strictly for vernal creeks and pools. A terrestrial orchid, clustered lady's slipper (*Cypripedium fasciculatum*), is found in old growth Douglas-fir in the Monument often under older madrone and canyon live oak. Other rare plant species have a wider amplitude and are found in several different types of communities, or are found in transitional zones between homogeneous communities. Species like the federally listed Gentner's fritillaria is known from mixed evergreen, oak woodlands, chaparral and grassland edges. Green's mariposa lily (Calochortus greeni) can be found in Oregon white oak-western juniper / wedgeleaf ceanothus-klamath plum communities, Ponderosa pine - white oak / savanna , and on the margin of open grasslands (now often dominated by annual grasses). Some species occur in microsites within larger, more discrete communities. Rare plant species like *Nemacladus capillaris*, *Monardella glauca* and *Hieracium greenei* are documented in 'rocky openings' within mixed conifer communities. Vegetation treatments and management activities within grasslands, riparian areas, oak woodlands, mixed conifer and old growth conifer communities have the potential to influence rare plant species.

All the proposed alternatives could impact rare plants and their habitats to varying degrees. Past observations, literature, and professional judgement all are utilized to evaluate effects. For many rare plant species, little is known about their biology and autecological relationships. Very few formal scientific studies have been done on rare plants here in southwest Oregon. Any disturbance activity or event that affects vegetation, the substrate (soil/duff/bark/rocks), the hydrology, microclimate, or successional state of communities containing rare plants, has the potential for causing adverse, neutral or beneficial effects. The magnitude or significance of the effect can depend on the duration and the severity of the event. The predicted direct and indirect impacts vary with activity, the season of the activity, the type of plant community, and species involved. The management activities within the Cascade Siskiyou National Monument that have the greatest potential for affects on rare plants and their habitats are grazing, vegetation management activities, road building, prescribed fire, and fire suppression.

While some activities can cause immediate direct affects, they can also create long-term indirect or cumulative benefits. For example, thinning or burning activities can directly harm rare plants by direct physical damage or soil disturbance, the burning of individual plants, or baking of underground roots and bulbs. However, the resulting habitat can provide more open, optimal conditions for certain rare plant species. Likewise, noxious weed control can result in unintentional kill of non-target species, including rare plants. However, by reducing the competitive weed threat that weeds present, over the long-term the habitat, and ultimately the species themselves, will benefit. Conversely, fire suppression in grasslands, chaparral, and oak woodland habitats can (in the short-term) 'protect' rare plant populations from harm. However, in the long-term, increased densities of 'invading' shrubs and trees can reduce suitable habitat conditions for certain plant species adapted to more open conditions. Fire suppression also in the long-term can result in unprecedented fuel loads in certain habitats, so that the severity of a future wildfire would be extreme.

Table 4-20 describes potential effects to rare plants and their habitats based on proposed management activities. It is recognized that these rare plants include organisms of differing genetics, ecological requirements, and responses. All organisms may not react in the same way to a given activity. Site specific analysis must be done for individual projects based on proposed actions and the species present. The table provides a general response estimate to all rare plants and not necessarily to individual species.

Table 4-20. Potential Effects to Special Status Plants or Habitats as a result of Proposed Activities

Vegetation Management in Diversity Area (Grass/Shrub Woodland Communities)

1. Direct mortality from activities depending on timing of action; prevention of flowering and reduction in seed production; disruption of rare plant pollinators and habitat; reduced population size or loss of populations
2. Physical disturbance and loss of duff, organic, and mineral soils affecting nutrients, hydrology, and growing sites
3. Physical alteration of rare plant substrates especially duff, soil, tree bases, rocks, branches, and downed woody debris
4. Increased exotic annual grasses and weed species by creation of optimal 'weed' habitat; further degradation of already invaded areas by release of weed seed bank and weed spread in resulting early successional habitats
5. Increased reproduction and population size; creation of optimal habitat by simulating 'natural' fire processes
6. Exotic and noxious weed control can adversely affect rare plants if present in treatment areas. Decreased noxious weeds would create more optimal habitat to rare plants

Table 4-20. Potential Effects to Special Status Plants or Habitats as a result of Proposed Activities

Vegetation Management in Old-growth Emphasis Area (Conifer communities)

1. Direct physical injury to rare plants, depending on the season of the action; decrease in reproduction and seed production; disruption of rare plant pollinators and habitat; reduced population size; loss of populations
2. Physical disturbance and loss of duff, organic layer, and mineral soils affecting nutrients, hydrology, growing sites, and important fungal relationships (especially for rare orchids)
3. Physical alteration of rare plant substrates especially duff, mineral soil, tree bases, snags, low limbs, rocks, downed logs
4. Changes in light, humidity, temperature, wind and precipitation interception from a decrease in canopy closure
5. Changes in the successional state of the plant community can adversely affect some and benefit other rare plant species (species specific). Habitat loss often is not permanent
6. Increase in early-successional, under-story species, including the introduction and spread of exotic annual grasses and weeds that can compete with rare plants for space, light, water and nutrients

Fire Suppression (in Diversity or Old Growth Emphasis Areas)

1. Direct mortality from equipment/personnel; prevention of flowering and seed production; reduced population sizes of rare plants by direct physical damage from line building activities
2. Compaction of soil from equipment (dozers)
3. Increased risk of catastrophic, intense, stand replacing fires causing a loss of rare plants and habitat on a large scale
4. Changes in nutrients by use of fire retardant (fertilizer based)
5. Loss of rare plant habitats or substrates by physical disturbance, e.g. falling snags, tractor piling woody debris, dozer line building, organic litter layer raking
6. Changes to native vegetation and further degradation of already invaded areas by spread of introduced grasses or weeds through ground disturbing activities, especially from equipment
7. Increase in later successional communities by excluding fire; increased canopy, higher levels of downed woody debris / fuel loads benefitting some and adversely affecting other rare plants

Prescribed Fire (in Diversity or Old Growth Emphasis Areas)

1. Direct mortality from fire, depending on the timing of the action; prevention of flowering and reduction in seed production; reduced population size
2. Loss of habitats or substrates by physical disturbance, e.g. falling snags, burning of downed woody debris, duff, and organic layers, organic litter layer raking, decrease in canopy cover, baking the soil
3. Increase in exotic grasses and weed species by creation of optimal 'weed' habitat depending on presence existing populations; further degradation of already invaded areas by release of seed bank and weed spread in early successional habitat
4. Decreased risk of large scale, severe, catastrophic wildfire that could adversely affect rare plants and habitat. More frequent, less intense ground fire will benefit some rare plants by creation of more suitable habitat
5. Changes in successional states, structure and composition of plant communities, adversely affecting some and benefitting other rare plant species.

Table 4-20. Potential Effects to Special Status Plants or Habitats as a result of Proposed Activities

Special Forest Products Collection

1. Intense commercial or personal use collection of rare plants can result in decreased population sizes, and potentially reduce genetic diversity by harvesting reproducing individuals and depleting the seed bank through time. Depending on the demand, populations can be eliminated
2. Collection of rare plants is not allowed under the current permit system except for authorized voucher specimens and scientific research

Transportation, Rights-of-Way/Communication and Visitor facilities

1. Permanent loss of rare plant habitat, individuals and small populations from construction of roads, facilities, skid roads, and landings
2. Available water and nutrients for vegetation is redirected by road ditches and culverts
3. Increase in exotic and weed species along roads; further degradation of already invaded areas by spread of introduced or weed species through new road construction, road use and maintenance, and road decommissioning and rehabilitation (soil disturbance)
4. Increased access can result in increased illegal harvesting / collection of rare plants
5. Changes to microclimate in surrounding habitat; edge effect influence
6. Loss of rare plant habitat and populations by road construction, communication facilities and rock source (quarrys) development in desirable rocky ridgetop locations

Mechanized Recreation (Off-Highway Vehicle Use)

1. Direct mortality from crushing; prevention of flowering and reduction in seed production; reduced population size
2. Changes to rare plant habitats, introduction of exotic grasses and weeds, and spread of existing weeds through seed transportation and ground disturbance creating optimal weed habitat (bare soil)
3. Hydrological changes from erosion along trails
4. No affects to rare plants if activity confined to open, existing roads (no off road)

Recreation / Non-mechanized Recreation / Horse/Pack Stock Recreation

1. Illegal harvesting / collection and incidental 'wildflower' picking of rare plants can occur with increased visitor use
2. Direct mortality from human trampling, trail building, and maintenance; browsing and trampling from pack stock; results in prevention of flowering and reduction in seed production; reduced population size or loss of small populations
3. Increase in introduced plants and weed establishment from disturbance; expansion of existing infestations along trails, trail heads, high recreation use sites, and dispersed camp sites

Affects of the Alternatives on Special Status Plants

The affects of the alternatives on Bureau Special Status plants (i.e. rare plants) are discussed by the major categories displayed in Chapter 3. Table 4-20 displays general potential effects from these actions. The discussion below identifies the major effects from the proposed actions under each of the alternatives. Table 4-21 summarizes influences to rare plants from the proposed alternatives.

Alternative A - No Action Alternative

Vegetation Management (Diversity Emphasis Area and Old-Growth Emphasis Area)

Management actions affecting vegetation, with the exception of noxious weed treatments (below), has currently been deferred until completion of a CSNM Plan. There would be no significant effects to any rare plant species or habitat under this alternative. No prescribed burning will occur. Fire suppression tactics would occur with long term adverse effects. (see actions common to all alternatives, below). No significant direct or indirect effects will occur from this 'no action' alternative; existing populations will continue to exist and be exposed to 'natural' stochastic events (e.g. windthrow, wildlfire, herbivory etc.). The cumulative effects are moderate in the Diversity Emphasis Area; past activities and treatments have likely affected populations of rare plants and habitat. Cumulative effects in the Old-Growth Emphasis Area are likely high; past activities and treatments have adversely affected rare plants and populations.

Noxious Weed Control

Noxious weed control treatments have the potential to affect non-target species. A number of habitats in the Monument, especially grasslands, open chaparral and oak woodlands, that contain introduced plants (e.g. annual grasses) and noxious weeds (e.g. yellow starthistle) also contain populations of rare plants. Noxious weeds and other aggressive introduced plants (e.g. annual grasses) threaten rare plants by competing with them for space, light, water and nutrients. Direct, localized adverse effects to individual rare plants can result from hand-pulling, roadside spraying and backpack spraying, depending on the proximity of rare plants from the target weed species, and the mitigation measures designed to protect rare plants. Indirectly, the removal of these weedy species will be beneficial to rare species in these habitats. Through time, if untreated, noxious weeds can eliminate populations and render rare plant habitat unsuitable. Past activities (e.g. grazing, road construction and use, and timber management activities) on federal and non-federal lands have resulted in the introduction and spread of noxious weeds. Recent noxious weed control in the monument has been limited to a few roadsides. Cumulative adverse effects from noxious weed control on rare plants are low; little control has ever occurred.

Special Forest Products

Under interim guidelines for the Monument, commercial and personal use collection of special forest products (fungi, medicinal plants, burls, boughs, etc.) would not be allowed. While the collection of rare plants currently is not authorized under permit, except in special cases regarding scientific research and herbarium voucher specimens, any 'incidental' harvest of rare fungi and rare plants with medicinal properties would be not be allowed. This would have a direct and indirect beneficial effect for rare plants, as individuals and populations will be maintained. Past harvesting has likely affected some rare plant species, like Green's mariposa lily (*Calochortus greenei*). However, the scale and intensity of rare plant collection has been small within the Monument. Cumulative effects are low.

Transportation

Under this alternative, road maintenance, rehabilitation, restoration, and new construction are allowed. These activities would follow the guidelines of the Aquatic Conservation Strategy and Best Management Practices. Rare plants have been found along road edges, and within the road prism of old, closed roads. Without site specific mitigation, rare plant populations and habitat could be adversely affected from these activities, especially new road construction and large scale restoration work that affects vegetated cut and fill slopes or areas adjacent to the road prism. General road maintenance overall has little significant effects. Potential indirect effects are the introduction and spread of noxious weeds in disturbed habitats, and microclimate changes to adjacent occupied habitat from the linear openings created by roads. Past activities undoubtedly have altered habitat and affected populations. Activities on adjacent non-federal lands have likely affected habitat and populations within the Monument boundaries. Cumulative effects are high with regard to the loss of rare plants and alteration of rare plant habitat.

Mechanized Recreation

All vehicles are prohibited from leaving designated roads in this alternative. The use of existing open roads by motorized and mechanized vehicles would have no direct affects to rare plants or habitat. Existing, open roads are not suitable rare plant habitat. Indirectly, mechanized recreation can contribute to the spread of noxious weeds along roadways, and introduce weeds into new areas off the roadway. Some illegal off-road use is likely to occur. This would have some localized adverse effects to rare plants and habitat, especially in open woodlands/ grasslands along open ridge-lines, and in vernally wet meadows. Assuming that vehicles stay on open designated roads, the potential affects to rare plants would be limited. Cumulative effects from mechanized recreation are moderate; past activities have likely affected some rare plants and habitats.

Non-Mechanized Recreation

This activity is unrestricted in the Monument with this alternative. These effects are very hard to predict considering the large area, and the array of future recreation possibilities. Rare plant habitats along ridge lines, high points, and at lakes and riparian sites would experience increased use through time. Unrestricted non-mechanized recreation would have some localized direct effects from trampling on individual rare plants, or picking of rare plant flowers. Based on the current and reasonably foreseeable level of use, these effects would be localized and probably have insignificant effects to the viability of rare plant populations in the Monument. Some indirect effects are possible from the introduction and spread of noxious weeds by hikers along official and unofficial trails, and in dispersed campsites. Cumulative effects on non-mechanized recreation are low, past activities have not likely had significant effects to rare plants.

Recreational Animal Stock Use

Commercial recreational animal stock use is not allowed under this alternative. However, non-commercial recreational animal stock use is unrestricted within the Monument. Off-trail stock use has the potential for localized direct adverse effects to rare plants and habitat. Many rare plants are palatable, including the federally listed Gentner's fritillary (*Fritillaria gentneri*). Unrestricted stock use can directly effect rare plants by trampling and browsing. Indirect effects from modification of habitat include disturbing the soil, duff and other rare plant substrates, and the introduction and spread of noxious weeds that can compete with rare plants. Repeated use can create new trails especially along ridgelines, leading to increased access. Cumulative effects are moderate; past use has likely affected some rare plants and habitats in localized areas.

Visitor Facilities

This alternative does not expand existing visitor facilities at Hyatt Lake, but it allows new parking, trail-head facilities, new interpretive sites, signing, and toilets, as needed. Any ground disturbing actions (construction of new facilities) can affect rare plants if they are present at the site. Direct adverse affects from new construction are possible. The magnitude of these effects however, would be relatively small; few acres in the monument would be directly impacted. Indirect effects include increased visitor use, and an increase and spread of introduced and noxious weeds around recreation sites from visiting vehicles. Cumulative effects are low to moderate; past construction of visitor facilities have potentially affected some rare plants and habitat but the scale of impacts have been limited.

Linear Rights-of-Way and Communication Sites

This alternative allows for continued granting of Rights-of-Way, leases, and permits. Current permits and agreements on existing roads, including road maintenance, will not have significant effects to rare plants, unless major road restoration/relocation work occurs. The building of new roads, new power line construction or expansion, and construction of communication sites (ridge tops and peaks) can directly adversely affect rare plants and habitats. Access roads and the disturbed corridor under power lines can provide for the spread of introduced and noxious weeds into un-infested areas, indirectly affecting rare plants. Cumulative effects are high; past activities have likely adversely affected rare plant populations especially along the existing power line corridors and past road construction for Rights-of-Ways.

Action Alternatives - Alternatives B, C and D

In this section, the action alternatives are discussed by the management actions identified under each alternative. Table 4-21 displays a summary of overall effects.

Vegetation Management (Diversity Emphasis Area)

There is a wide range of effects from the differing action alternatives.

Alternative B focuses on allowing 'natural processes' to occur to maintain diversity of grasslands, chaparral and oak woodlands. Surveying and monitoring will be the emphasis. No prescribed burning will occur. Noxious weed control will be allowed and is discussed separately (see below). No significant direct or indirect effects to rare plants are expected from surveying and monitoring. Cumulative effects are low.

Alternatives C and D vary in the tools used to maintain and restore habitat, and in the intensity and acres of treatment. Any ground disturbing activity has the potential to adversely affect rare plant populations if populations are in the treated area. Reducing shrub and invading tree densities, opening canopies, and reducing the risk of catastrophic wildfire, can provide indirect beneficial effects by maintaining and creating suitable habitat for many documented rare plants associated with these diverse communities.

Alternative C minimizes soil disturbance and does not allow the use of heavy machines, except for road restoration work. Broadcast burning, manual thinning, hand piling and burning of piles are used to reduce shrub and tree densities and restore grasslands, chaparral and oak woodlands. This activity does have the potential to adversely affect localized individuals and small populations of rare plants, mostly from direct physical impacts. Cumulative effects are moderate, some populations and habitat have likely experienced affects from past activities.

Prescribed fire is utilized both in Alternatives C and D in the Diversity Area. Fire has the potential to adversely affect individuals and populations (especially vascular plants) if burning is done in the spring or early summer during the growing season. Spring burns (after late February) and early summer burns (before July) can directly burn growing plants, reduce reproduction, and population size in the short-term, including affects to the listed plant Gentner's fritillary. Fall burns would have little significant direct effects as most rare plants have gone dormant. Indirectly, over the long-term, the resulting habitat following a thinning or burning activity can provide better growing conditions (increased light and moisture), and reduced fuel loads. This would provide a long-term benefit for many rare plants in the monument found in grasslands, chaparral and oak woodlands. If not addressed and mitigated, prescribed fire also can increase introduced and noxious weed populations, especially in grasslands, by creating optimal growing conditions for those species as well.

Alternative D allows the use of all available tools to aggressively treat the landscape, and includes the use of heavy machines, mechanical chippers, tractors, discs and plows. The increased level of ground disturbance and treatment acres would increase the risk of direct adverse affects on rare plant populations in the Monument. Like Alternative C, in the long-term, the resulting stand conditions would provide better habitat for surviving populations of rare plants. The affects of prescribed fire are similar to the effects of Alternative C, with some potential adverse effects initially, and beneficial effects in the long-term as a result of more diverse, and improved habitats. Cumulative effects are moderate, some past affects have likely occurred to some rare plants.

Vegetation Management (Old-Growth Emphasis Area)

Alternative B allows for the treatment of early to mid conifer stands to move them toward late successional stands. This includes pre-commercial thinning, slash reduction treatments, pile burning, and treatments within riparian reserves in sub-watersheds lacking late old growth. The treatments are non-commercial. Very young stands (often older plantations) often less than 30 years of age, are generally not considered highly suitable habitat for most rare plants found in conifer communities, although a few occurrences have been documented. Several rare plants have been found in small, usually rocky, openings within mixed conifer communities, and in old clearcuts in the Monument. There would be little significant direct or indirect effects to these populations of rare plants in these younger stands; some individual plants could be affected. Thinning activities (cutting trees), piling and burning, in slightly older stands however, does have the potential to have localized adverse affects on some rare plant species and on several rare fungi and lichens that are on the Bureau Special Status list. The continued and accelerated development of late-successional and old-growth stands within the Monument would benefit certain rare plants associated with these habitats in the long-term. A number of rare plant species associated with conifer stands are found in mature and old growth stands. For this alternative, while there could be localized direct effects in the short-term, indirectly some habitat for many rare plants would be improved in the long-term. Cumulative effects are high; past vegetation activities in conifer communities on federal and non-federal lands have likely affected rare plants in the Monument that are associated with conifer communities.

Alternative C focuses on protecting late-successional conifer stands from the threat of catastrophic wildfire. This is accomplished by reducing fuel loads in all high fire hazard conifer stands adjacent to old growth stands by thinning (pre-commercial and commercial) and fuel reduction treatments (slashing/burning). Fuel treatments within existing high fire hazard old growth stands would also occur. Attention will be given to reducing white fir (*Abies concolor*) component from these old growth stands by thinning or using understory burning. Several of the rare fungi species are usually associated with white fir. Several rare plants are associated with mature and old-growth Douglas-fir stands. These activities can directly adversely affect rare plants by physical disturbance, altering the substrate and growing sites, and changing the microclimate. Several rare plant species found in mid to late-successional conifer stands can be adversely affected from burning activities, depending on the intensity and season . Indirectly the resulting habitat following localized under-story burning would benefit certain rare plants. Indirectly, soil disturbance from machinery and road building can result in increased levels of noxious weeds in affected stands, especially weedy thistle species. The continued and accelerated development of late-successional and old-growth stands within the Monument would provide habitat and benefit certain rare plants associated with these habitats in the long-term, as long as existing populations survive and can colonize these sites. Reducing the risk of catastrophic, stand replacing wildfire indirectly would benefit rare plants, including those in adjacent evergreen hardwood and chaparral communities. The cumulative effects are high; past harvest activities within the Monument on federal and non-federal lands have undoubtedly affected rare plants associated with mature and old-growth conifer forests.

Alternative D incorporates Alternative C with additional treatments on more acres to protect and enhance existing late-successional and old-growth forests by pre-commercial and commercial thinning, and fuel reduction treatments (piling and burning). More acres of potential old-growth would also be treated. The effects of this alternative are similar to Alternative C except that more acres of old-growth would be treated. Adverse direct and indirect effects to later succession rare plants are probable, similar to Alternative C. The continued and accelerated development of late-successional and old-growth stands within the Monument would provide more habitat and benefit certain rare plants associated with these habitats in the long-term, as long as existing populations survive and can colonize these sites. The cumulative effects are high; past harvest activities within the monument on federal and non-federal lands have undoubtedly affected rare plants associated with mature and old growth conifer forests.

Noxious Weed Control

Noxious weed control treatments (hand pulling, mowing, chemical spraying) have the potential to affect non-target species including rare plants in all alternatives. Biological control (i.e. exotic insects) would not have any significant affects on any rare plant species. None of these approved biological control insects have been documented to target any rare plant species known in the Monument. Bio-control measures also generally don't eliminate weed populations in the short-term. The effects to rare plants from noxious weed control is the same for all action alternatives, with the exception that more acres of vegetation treatment and ground disturbance increase under the successive alternatives. As more acres experience ground disturbance, the risk of the spread of existing noxious weeds, and the introduction of new weed species into the Monument increases. If untreated, this will result in more acres of infestation and the need to treat more acres in the future.

A number of 'natural' and disturbed habitats in the Monument contain introduced and noxious weeds, especially grasslands, open chaparral, oak woodland savannahs, roadsides, old landings, skid roads in past harvest units, and old pastures. Noxious weeds and other aggressive introduced plants (e.g. annual grasses) threaten rare plants by competing with them for space, light, water and nutrients. Direct, localized adverse effects to individual rare plants can result from mechanical and chemical treatments depending on the proximity of growing rare plants from the target weed species, and the season of treatment. The use of fire to reduce weeds also can adversely affect rare plants depending on the season of use and intensity of the burn. Burning during the growing season (spring/early summer) would kill individual rare plants if present in the treatment area. Populations may survive depending on the existing seed bank, the severity and pattern of the burn, and the species ability to survive fire (e.g. perennial, deep rooted species). Indirectly, the removal of these weeds will be beneficial to rare species in these habitats in the long-term, so long as individual rare plants survive and are able to re-colonize restored habitats. Through time, if not treated, and if habitats continue to experience disturbance perturbations from drought, wildfire, grazing, and other management activities, noxious weeds will render some plant communities unsuitable for rare plants, and change the ecology of rare plant communities.

Past activities (e.g. grazing, road construction, and timber management activities) on federal and non-federal lands have likely resulted in the introduction and spread of noxious weeds. Recent noxious weed control in the Monument has been limited to a few roadsides treatments for Canadian thistle. Cumulative adverse effects from noxious weed control on rare plants are low; little control has ever occurred in the Monument.

Special Forest Products

Alternative B restricts all commercial and personal use collection of Special Forest Products (SPFs), including fungi and medicinal plants, with the exception of approved scientific research, and existing Tribal rights. As some rare fungi and rare plants have food, herbal, and medicinal uses, this would have a direct beneficial affect; harvesting of rare plants would be reduced. Potential ground disturbance from collection of any SFPs would not occur. Past harvesting of certain plants has affected some rare species like Green's mariposa lily (*Calochortus greenei*), which was commercially collected historically. However, the scale and intensity of rare plant collection overall has been small within the Monument. Cumulative effects are low.

Alternatives C and D restrict all commercial harvests, but allows personal collections for fungi. Harvests of all other Special Forest Products is not allowed. This would protect most rare plants, with the exception of a few rare fungi that are also edible. Some limited direct affects would occur, however the scale and intensity of collection of these few species is probably insignificant. Most mushroom collectors are targeting species like morels or chanterelles, which are not rare. Cumulative effects from past, present and future collections are low.

Transportation

Under all the action Alternatives (B, C, and D), road maintenance, rehabilitation, restoration, removal, and new construction is allowed, following the guidelines of the Monument Aquatic Conservation Strategy and Best Management Practices. The scale of activities differs mainly between leaving open, maintaining, and closing certain roads, and the methods used to close or maintain roads. Certain rare plants have been found along road edges, and within the road prism of old, closed roads. These rare plant populations can be adversely affected from closure and restoration/rehabilitation activities from direct physical effects from equipment. The scale of these effects is limited however, as few rare plants routinely occupy road habitat. These incidental sites are often outliers of existing occurrences off the roadway in the local vicinity. General road maintenance has slight, usually insignificant effects. New road construction, which is allowed under all the alternatives, and large-scale restoration work that affects vegetated cut and fill slopes or intact vegetation adjacent to the road prism, has the potential to directly affect rare plant populations and individuals. Potential indirect effects are the introduction and spread of noxious weeds in disturbed habitats, and microclimate changes to adjacent occupied habitat from the linear openings created by roads. Cumulative effects are high with regard to the loss of rare plants and alteration of rare plant habitat. Past transportation activities have altered habitat and likely adversely affected populations on federal and non-federal lands within the Monument boundaries.

Mechanized Recreation

All vehicles are prohibited from leaving designated roads in Alternatives B, C and D. The use of existing open roads by motorized and mechanized vehicles in the action alternatives would have no direct effects to rare plants or habitat. Existing, open roads are not highly suitable rare plant habitat. Indirectly, mechanized recreation can contribute to the spread of noxious weeds along roadways, depending on the existing densities, and introduce weeds into new areas off the roadway. Some illegal off-road use will occur given access. This would have some localized adverse effects to rare plants and habitat, especially in open woodlands and grasslands along open ridge-lines, and in vernally wet meadows. In Alternative D, new road construction for mechanized recreation would be allowed. This could have the same direct and indirect effects to rare plants as road construction for other uses (discussed above). If not mitigated, adverse effects from new construction will occur if rare plants are present. Cumulative effects from mechanized recreation are moderate; past activities, especially off road travel in rare plant habitat, have likely affected some rare plants in the recent past.

Non-Mechanized Recreation and Animal Stock Use

Under Alternative B, no new hiking trails would be constructed, camping would only occur in existing campgrounds, only existing BLM trails would be maintained, and a number of recreation activities would not be allowed in the Monument (technical rock climbing, hang gliding, etc.). This alternative would generally confine non-mechanized recreation to existing recreation sites and trails, and reduce any incidental adverse effects (e.g. trampling and picking) to rare plant populations from recreation. Cross country hiking would be permitted, except off trail or roads in the RNAs. Animal Stock use in Alternative B is not allowed, with the exception of permitted cattle grazing in the Monument which will be studied for three years. Alternative B would have a beneficial effect to rare plants and habitats by decreasing localized effects from non-mechanized recreation from current levels.

Alternatives C and D allows 'leave no trace' camping across most of the Monument. Some localized adverse effects (trampling) from hiking, camping and hang-gliders on individual rare plants could occur. The effects from hang gliders and para-sailors launching, landing or crashing into occupied rare plant habitat could have some limited effects to individual rare plants if present in those areas, mostly from soil disturbance and trampling impacts. Hiking, camping and flying off ridges will be insignificant to the viability of existing populations given the levels of current and foreseeable future use. Alternatives C and D allow for new trail construction, and off trail stock use. These actions will have adverse direct effects on localized populations of rare plant species. Trail construction can destroy small populations of rare plants and stock use can trample and browse rare plants. New un-official horse trails can be created through time, especially along open ridge lines that also are habitat for several rare species, including the listed Gentner's fritillary. Indirectly, off trail stock use can spread existing noxious weeds through physical disturbance, especially along ridge lines and open oak woodland / grassland habitats. Alternatives C and D differ in the numbers of stock use allowed, but overall the difference is insignificant with regard to predicted localized effects; effects will depend on where and when the activities occur. Cumulative effects from non-mechanized recreation in the action Alternatives B, C and D, are likely low to moderate; past activities have had some significant localized effects to rare plants.

Visitor Facilities

Alternative B does not expand existing visitor facilities and allows only for the maintenance of existing facilities and interpretive sites. As no new ground disturbing activities would occur this alternative would have no significant direct influences to rare plants species. The maintenance of existing facilities has no significant effects on rare plants. The current and foreseeable future use of the designated facilities would not affect rare plant populations. Cumulative effects are low; past maintenance of facilities have not significantly affected rare plants.

Alternative C allows for the maintenance of existing facilities and some improvement and alteration of existing facilities and interpretive sites. New parking and new trailhead facilities would be allowed at existing sites to protect resources. Some limited ground disturbing activities could occur. Limited direct adverse affects to rare plants are possible if plants are present in those areas. Cumulative effects are low to moderate; past construction may have had some limited affects to rare plants. However, the magnitude of these effects has been small within the Monument.

Alternative D is allows for new construction and development of existing and new sites for recreation and interpretation. The development of new facilities would involve ground disturbing activities, and has the potential for direct adverse effects to rare plants and habitat if occurrences are present. Ground disturbance and increased visitor use could result in the spread and increase of noxious weeds. Cumulative effects are similar to Alternative C.

Linear Rights-of-Way and Communication Sites

Alternative B does not authorize any new Rights-of-Way or communication sites. No expansion of existing sites and facilities would be allowed; maintenance of existing features under permit would be allowed, subject to valid existing rights. This would not have any significant direct or indirect effects to rare plants within the Monument. Cumulative effects are moderate to high; past activities have likely affected rare plants and habitat, especially from roads and power line construction.

Alternatives C and D have the same effects for rare plants. Both would not allow new communication sites or new facilities development, however new Rights-of-Way permits could be issued. Ground disturbing activities could directly adversely affect rare plants and suitable habitat. Cumulative effects are moderate to high; past activities have likely affected rare plants and habitat, especially from roads and power line construction.

Table 4-21 ranks and compares potential adverse effects to Bureau Special Status Plant species and their habitats by proposed alternatives.

Table 4-21. Summarizes the Predicted Overall Effects of Proposed Alternatives on Bureau Special Status Plants by Activities

Activities	Alt. A	Alt. B	Alt. C	Alt. D
Vegetation Mgt in Diversity Emphasis Area	0	0	– +	– +
Vegetation Mgt in Old Growth Emphasis Area	0	– +	– +	– +
Noxious Weed Treatments	– +	– +	– +	– +
Special Forest Products	+	+	0	0
Transportation	– –	– –	– –	– –
Mechanical Recreation	–	–	–	– –
Non-Mechanized Recreation	–	+	– –	– –
Animal Stock Use	– –	+	– –	–
Visitor Facilities	–	0	–	– –
ROW's / Communication Sites	– –	0	– –	– –
Fire Suppression	+ –	+ –	+ –	+ –

– - slight, limited adverse effects
– – - adverse effects
– + - short-term adverse effects, long-term beneficial effects
0 - Neutral effect or no significant effects
+ – - overall short-term beneficial effects, long-term adverse effects
+ - beneficial effects

Analysis of Features Common to All Alternatives that Affect Rare Plants

Monument Aquatic Conservation Strategy

The Monument Aquatic Conservation Strategy provides for some secondary protection for rare plants species, especially those found in riparian, springs and wetland communities. Riparian reserves established for aquatic concerns often provide for protection of certain riparian rare plants. Restoration and enhancement activities are also allowed in riparian reserves when they benefit aquatic habitat and species. Unfortunately, these activities while benefitting aquatic habitat, can adversely affect rare plants that live in the terrestrial component of riparian areas and flood plains. The use of equipment in riparian areas, and the placing of in-stream large woody debris, can crush rare plants, and alter habitat and existing micro-habitat conditions. While wetlands and springs have been identified as high priority for restoration because of rare endemic mollusks, seeps and springs also are highly suitable habitat for rare plants as well. Unless restoration activities in these fragile habitats are designed to address rare riparian plants as well, adverse direct and indirect effects to these species are possible.

Wildfire suppression

Continued wildfire suppression under the existing agreement with the Oregon State Department of Forestry in the Monument has the potential to cause some direct adverse effects to rare plants in the monument, if populations exist in action areas. Much of the lands in the Monument have not had formal rare plant surveys; highly suitable unsurveyed habitat is abundant. Known sites are mapped and available to Resource advisors so as to minimize effects to rare plant sites, including the location of the federally listed *Fritillaria gentneri*. By law (Endangered Species Act, 1973, as amended), emergency consultation with the U.S. Fish and Wildlife Service is required if emergency situations (fires) threaten or affect this species.

Fire suppression tactics allowed in the Monument, especially the use of heavy equipment and bulldozers along ridge lines and in open oak woodlands, can adversely affect rare plants and habitat as fire lines are dug. Off-road vehicles are not allowed in the Monument, with the exception of bulldozers for wildfire. The construction of heli-spots can also affect small areas of suitable habitat for rare plants, especially on open ridge lines. Fire retardant, which is fertilizer based, can change nutrient levels, especially for species adapted to nutrient limited sites (shallow soiled, rocky areas along ridge-lines). Current fire suppression tactics within the Monument allow engines and other equipment off road, although efforts to minimize crossings of stream, seeps and springs is mandated.

At the landscape level, suppressing fires will provide immediate direct protection of occupied rare plant habitat, especially in grasslands, chaparral and mixed evergreen/oak wood lands. Indirectly, the exclusion of fire in many of these communities that support rare plants will adversely affect populations through time. Increased canopy cover (shrubs and trees), decreased light and moisture can reduce the reproducing population size of many rare plants, and allow succession to reduce suitable habitat. Fire exclusion has lead to increased densities and fuel loads such that a large fire event is inevitable. The resulting event could be of such a severity and at such a scale, that rare plants populations could be eliminated from whole drainages. Some other rare plant species, adapted to late-successional conifer communities may benefit from a late-successional condition, depending on the potential of the site. Cumulative effects from fire suppression tactics are high; past suppression efforts have likely lead to the loss of some rare plant populations, and rare plant habitat. Current suppression tactics will continue to affect plants. Regardless of future suppression tactics, large fire events, perhaps ones more severe that recent historical fires, are inevitable.

Table 4-22 is a compilation of the alternatives comparison table used to help determine cumulative effects. Effects were considered across all land use allocations and includes all proposed management activities.

Table 4-22. Cumulative Effects to Rare Plants and Associated Habitat

Proposed Activity	Overall Cumulative Effects by Alternative			
	A	B	C	D
Vegetation Mgt in Diversity Emphasis Area	Moderate	Low	Moderate	Moderate
Vegetation Mgt in Old Growth Emphasis Area	High	High	High	High
Noxious Weed Treatments	Low	Low	Low	Low
Special Forest Products	Low	Low	Low	Low
Transportation	High	High	High	High
Mechanical Recreation	Moderate	Moderate	Moderate	Moderate
Non-Mechanized Recreation	Low	Low	Low	Low
Animal Stock Use	Moderate	Moderate	Moderate	Moderate
Visitor Facilities	Low-moderate	Low	Low-Moderate	Low-Moderate
Rights-of-Way/ Communication Sites	High	High	High	High

Noxious Weeds and Introduced Plants

Noxious weeds and other introduced species alter ecological systems, reduce biodiversity and degrade habitat quality. The change in plant communities species composition is the most obvious effect. Left unmanaged, noxious weeds and introduced plants will often obtain and maintain site dominance. Many areas within the Monument, especially grasslands and open oak woodlands contain populations of introduced and noxious weed species. Altering the species composition also changes the physical structure of the plant community. Once these plants are established, they can alter soil properties, available soil moisture, the nutrient cycle, and indirectly, the insect, plant, and animal populations. Noxious weeds and introduced plants are usually associated with disturbed ground. However, some species can invade undisturbed and managed land in good condition, once introduced into an area.

Interspersed private lands compound the problem of weed management. Often, these lands are highly disturbed with established weed populations. Roads and trails passing through infested private land serve as seed sources for vehicles and recreationists to spread.

With few exceptions, any ground disturbing actions associated with the activities proposed in the different alternatives have the potential to exacerbate existing occurrences of introduced and weed species, depending on 1) proximity to existing populations (i.e. a source), 2) the scale and magnitude of the disturbance, and 3) effectiveness of any concurrent weed control treatments and re-vegetation efforts. Limited weed treatment control has occurred in the past on the lands within the Monument.

Management activities with the greatest potential for promoting weed establishment and spread are, grazing, vegetation treatments involving mechanical means, new road or trail construction, off-roadway vehicle and stock use, and the construction of new facilities. Even without significant disturbance from management actions, many introduced and noxious weed populations will continue to increase especially in grasslands, open oak woodlands, along roads and at visitor facilities. Table 4-23 reflects these slight increases. Noxious weed treatment is common to all alternatives and will result in a decrease of weeds in areas treated.

Thinning or fuel treatments in conifer communities, which is designed to protect and facilitate the development of old-growth communities, can cause soil disturbance resulting in available growing sites for weeds. Mechanical recreation on open roads can still spread weeds depending on the existing densities of weeds on the roads and road edges, however the effects are relatively slight. The construction of new roads, for any use, can result in increases in weeds if they are present or introduced into bared soil areas. Non-mechanized recreation can bring in new weeds into trail-heads, and spread weeds along trails and in camping areas. Stock use, especially off trail, can result in weed spread and introduction, mostly due to soil disturbance along trails, and weeds in feed and straw.

Prescribed fire used as a tool to reduce densities of other vegetation and fuels, and restore plant communities (especially grasslands, chaparral, and oak woodlands) can result in decreases or increases in introduced and noxious weed species depending on the timing of the burns, the proximity to seed sources, the severity, and how fast the site is regenerated with native species. In Alternatives A and B, no prescribed fire will occur. This "no-action" would still result in increases in introduced and noxious weeds in areas where large infestations currently exist, especially in already degraded habitats. Prescribed burning that is proposed in Alternative C and D, especially in the Diversity Emphasis Area will aid in rejuvenating plant communities, stimulating perennial grasses, and improving the health of these sites to resist weed invasions. Unfortunately, many of these sites already have high densities of annual grasses and exotic weeds like star-thistle such that just burning alone will likely not decrease these occurrences, and could increase populations. Decadent chaparral communities that have few remaining species in the under-story, once opened up by fire or mechanical means, can be sites that weeds can invade from adjacent occupied areas. Alternative D will also utilizes heavy machinery for treatment, which will have some inherent level of soil disturbance associated with it.

The Table 4-23 below provides an overall comparison of the proposed alternatives as they influence weed establishment and spread.

Table 4-23. Predicted Effects of Noxious Weeds Trends from Activities in Proposed Alternatives

Proposed Activity	A	B	C	D
Vegetation Mgt in Diversity Emphasis Area	Slight Increase	Slight Increase	Slight Increase	Increase
Vegetation Mgt in Old Growth Emphasis Area	Slight Increase	Increase	Increase	Increase
Noxious Weed Treatments	Decrease	Decrease	Decrease	Decrease
Special Forest Products	No effect	No effect	No effect	No effect
Transportation	Increase	Increase	Increase	Increase
Mechanical Recreation	Slight Increase	Slight Increase	Slight Increase	Increase
Non-Mechanized Recreation	Slight Increase	Slight Increase	Increase	Increase
Animal Stock Use	Increase	Slight Increase	Increase	Increase
Visitor Facilities	Slight Increase	Slight Increase	Slight Increase	Increase
ROW's / Communication Sites	Increase	Slight Increase	Increase	Increase

Cumulative effects of introduced and noxious weeds are moderate to high for all alternatives. Past activities have resulted in the establishment and expansion of weeds within the Monument. Historical and current control efforts have not occurred on very many acres on lands in the Monument. Existing occurrences will continue to spread, especially in grassland, open oak woodlands, and along roads without disturbance. Some proposed activities to provide for the health landscape processes, (e.g. thinning dense oak woodlands, burning grasslands or decadent chaparral) can in specific areas result in increased noxious weeds). Weed occurrences on non-federal lands are likely to continue to increase providing a source of seed to adjacent federal lands.

Fuels Management

Alternative A - Interim Management

The current trend of increasing fuel loadings would continue until fuels management activities are initiated. The use of prescribed fire would be delayed a minimum of one year. This delay would have short term minimal impacts on reducing fire hazard.

Alternative B

Fuels management activities would be utilized to mitigate slash that is created when thinning late-sucessional and old-growth (LSOG) habitat type 3. Approximately 3,400 acres would be treated over the next decade. Of these acres approximately 2,300 acres are of moderate and high fuel hazard within 1/4 mile of LSOG habitat types 1 and 2. The fuels reduction work on these acres would have some impact on protecting habitat types 1 and 2. The fuels reduction work would reduce ladder and surface fuels which in turn would reduce fire behavior such as fire intensity and flame length. By reducing flame length direct fire supression efforts would be more effective which could reduce the size of a wildfire. The reduciton of the size of a wildfire would minimize resources damaged. The change of fire intensity and flame length in these stands would also reduce the chance of a crown fire initiating in these stands which would reduce mortality to the forest stand.

Elsewhere in the CSNM, the use of prescribed fire would occur in unique cases such as the control of noxious weeds. This limited use would continue the absence of fire on a large portion of the CSNM. The probability increases, due to increased fuel loadings, when a fire starts under high to extreme fire conditions, it will burn at higher intensities than historically occurred in the low to moderate fire regimes which exist in the CSNM. Ecological objectives such as the development and maintenance of vegetative diversity in fire prone ecosystems would not be met within the CSNM.

Alternative C

This alternative better utilizes a landscape approach in fuels management. A landscape-level approach to fuels management is the most effective method in modifying fire behavior (intensity and size) of a wildfire. "A landscape-level approach to fuels looks at the large areas as a whole, in an attempt to fragment existing continuous, heavy fuel in high risk areas" (Weatherspoon and Skinner 1996). "Landscape-level treatments have been proposed as a fuel management strategy that can aid wildfire control and help achieve more broad-based ecosystem management goals" (Agee and Edmonds 1992, Weatherspoon 1996, Weatherspoon and Skinner 1996), "particularly in areas that have historically low- to moderate-severity fire regimes" (Agee 1993).

Areas of high fuel hazard within habitat 1 and 2 are proposed for treatment. The predicted fire behavior, within the areas of high fuel hazard, would produce flame lengths of six feet and greater. These predictions are from a surface fire burning under weather conditions that are typical in the CSNM for the months of July through September. Flame lengths of this size utilized in fire effects models estimates that over 50 percent of the trees in habitat types 1 and 2 would be killed. Treating existing surface fuels and ladder fuels of non-commercial size would alter the fire behavior of a surface fire which would minimize mortality to trees in habitat types 1 and 2.

All areas of high fire hazard and all moderate fire hazard of habitat 3 within 1/4 mile of habitat types 1 and 2 would also be treated. The treatment of these 6,000 acres further aids in the protection of habitat types 1 and 2 by reducing fuels that are currently available to burn in the event of a wildfire.

The alteration of these fuels would change existing fuel levels such that a higher probability exist that wildfires would burn at lower intensities. Fires which burn with lower intensities cause less damage to vegetation and soils and also allows direct suppression efforts to be utilized under more extreme weather conditions. When direct attack suppression methods can be used, fire size can be reduced under most cases.

Ecological objectives such as the development and maintenance of vegetative diversity in fire prone ecosystems would also be met. In the grasslands prescribed fire would increase native grass domination. Prescribed fire would help recreate a range of wedgeleaf ceanothus stand ages across the landscape and in Woodlands would help restore the balance of herbaceous plants, shrubs and trees.

Prescribed fire would also be used strategically on the landscape to reinforce natural features such as major ridge lines to aid in the suppression of wildfires. The ridge line that runs from Pilot Rock to Soda Mountain and Keene Ridge which runs from Soda Mountain to Jenny Creek has been identified as a critical natural feature for fire suppression by ODF. Wildfires which may start south of this ridge line under extreme weather conditions are a concern due to the high fuel hazard and limited access which exist in this area. Indirect suppression efforts would need to be taken along this ridge line in order to keep fires from burning onto private land and into the northern portion of the CSNM. Prioritizing fuels management work along and adjacent to this ridge line would increase the chance that this natural feature could be effectively and safely utilized in wildfire suppression efforts.

Alternative D

This alternative also utilizes a landscape approach in fuels management. An additional 4,400 acres of moderate hazard within 1/4 mile of habitat types 1 and 2 would be treated under this alternative. The treatment of these acres would further aid in the protection of habitat types 1 and 2 by reducing fuels that are currently available to burn in the event of a wildfire.

Ecological objectives such as the development and maintenance of vegetative diversity in fire prone ecosystems as described in Alternative C would also be met. The treatment of the additional acres would further help in meeting these objectives under this alternative.

Additional acres would also be treated along and adjacent to the ridge line that runs from Pilot Rock to Soda Mountain and Keene Ridge which runs from Soda Mountain to Jenny Creek. This would further increase the safety and effectiveness of this ridge line when used for indirect suppression of wildfires.

Wildfire Suppression

Suppression methods currently utilized within the CSNM would not be further restricted under any of the alternatives. Road access plays an important role in determining response time of initial attack forces to a fire. Road access is limited in the CSNM which is south of Soda Mountain, Pilot Rock, and Keene Ridge. Specific roads in this area which are critical for initial attack forces have been identified by the Oregon Department of Forestry. Refer to Table 4-24 for a list of these roads. The following is a description of each alternative in regards to road closures within the CSNM.

Alternative A - No Action

There would be no impacts to suppression efforts from what exist today. All existing roads that were identified by ODF that are critical for suppression needs in the area south of Soda Mountain, Pilot Rock, and Keene Ridge would be available for fire suppression efforts.

Alternative B

As in Alternative A, there would be no impacts to suppression efforts from what currently exist. All existing roads that were identified by ODF that are critical for suppression needs in the area south Soda Mountain, Pilot Rock, and Keene Ridge would be available for fire suppression efforts.

Several short road spurs throughout the CSNM would be decommissioned under this alternative. This could have some impact to initial attack response time but the expected impacts would be minimal.

Alternative C

All existing roads that were identified by ODF that are critical for suppression needs in the area south Soda Mountain, Pilot Rock, and Keene Ridge would be available for fire suppression efforts.

The same short road spurs that would be decommissioned under Alternative B would be decommissioned under this alternative. This could have some impact to initial attack response time but again impacts are expected to be minimal.

Improvements would be done on the Skookum Creek road and the Soda Mountain lookout road which could increase response time to fires. This would be a positive impact to suppression efforts.

Alternative D

Road systems that tie together greatly assist in suppression efforts. They allow access from different directions and more importantly they provide for more than one escape route for suppression forces. One important tie route that exist in the CSNM is the system that runs from Keene Ridge through Agate Flat to the Copco road. The roads that allow this to occur are the Skookum Creek road which runs from Keene Ridge to

Table 4-24. Key Roads needed for Wildfire Suppression Efforts within the CSNM

Road Name	Road Number/General Location
Power line Roads (Skookum Creek Road)	BLM 40-3E-27.2
Pilot Rock Jeep Road	BLM 40-3E-30.0
Tie Through Road to Emigrant Creek	Private road in T.40S.,R.2E., Section 36
Randcore Pass Road through Private Property to Agate Flat	BLM 40-4E-19.2
Randcore Pass to Rosebud Helipond	BLM 40-3E-19.1
Soda Mountain Road	BLM 39-3E-32.3
Mill Creek to Soda Mountain Road	BLM 40-3E-12.0
Access across Jenny Creek in multiple locations to private property	
Access from California	Copco Road

the Schoheim road in the Agate flat area which then ties into the Copco road. Alternative D would decommission the lower 1-1/2 miles of the Skookum Creek road which would in effect block this tie system. With this system blocked, when utilizing the Skookum Creek road for initial attack, the only escape route would be back up the road to Keene Creek. Escape routes uphill are not ideal and, in most cases, are too dangerous to use. In some cases, suppression tactics would be very limited due to the concern for fire fighter safety with only one escape route which is uphill. Indirect measures would be taken which could lead to larger acres burned.

As in Alternatives B and C several short road spurs throughout the CSNM would be decommissioned. Impacts would be the same as described under those alternatives.

Improvements would be done on the portions of the Skookum Creek road and the Soda Mountain lookout road. These improvements could increase response time to fires which would be a positive impact to suppression efforts.

Air Quality

All the alternatives propose to use prescribed fire so consequently all alternatives will have some smoke related impacts.

The Clean Air Act requires each state to develop and implement a State Implementation Plan (SIP) to ensure that National Ambient Air Quality Standards are attained and maintained for particulate matter (PM10). Within the implementation plan developed for Oregon, a goal to reduce particulate matter emissions (PM10) by 50 percent by the year 2000 was established. PM10 was also identified by the State Implementation Plan as the basis for non-attainment within the Grants Pass and Ashland/Medford area.

The focus of the analysis for each alternative of the effects on air quality from prescribed burning is on the production of PM10 (Particulate Matter smaller than 10 microns). In the Final Medford District Proposed Resource Management Plan/EIS (October 1994) base line emissions were established to measure the Medford District's progress towards meeting the 50 percent reduction of particulate matter emissions. This baseline of 20,000 tons per decade is used for this analysis.

To obtain some indication of how future burning within the CSNM may impact emission reduction goals, the estimated emissions of each alternative was compared to this baseline. For each alternative, projected emissions are well below the baseline value (refer to Figure 1). Based on this, it appears that prescribed burning proposed for the CSNM would not compromise the ability to reach and maintain prescribed burning reduction goals under any of the proposed alternatives.

Under all proposed alternatives, prescribed burning would comply with the guidelines established by the Oregon Smoke Management Plan (OSMP) and the Visibility Protection Plan. Prescribed burning under all alternatives is not expected to effect visibility

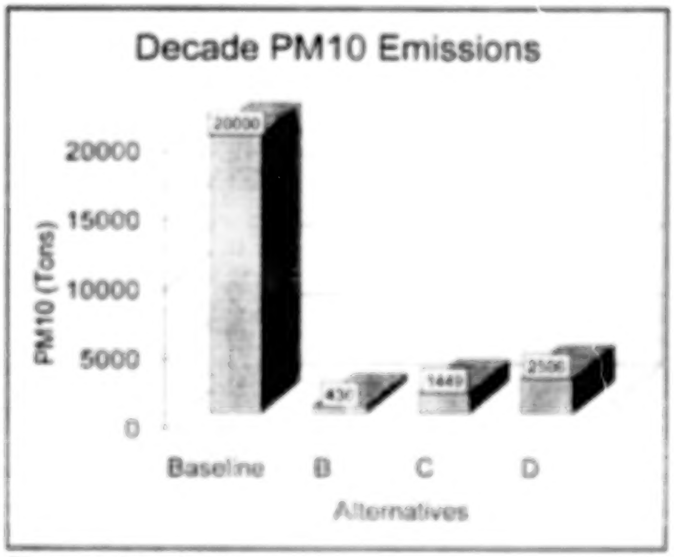


Figure 1: Decade PM10 Emissions

within the Crater Lake National and neighboring wilderness smoke sensitive Class I areas (Kalmiopsis and Mountain Lakes) during the visibility protection period (July 1 to September 15). Prescribed burning is not routinely conducted during this period primarily due to the risk of an escape wildfire.

Prescribed burning emissions, under all alternatives, is not expected to adversely effect annual PM10 attainment within the Grants Pass, Klamath Falls, and Medford / Ashland non-attainment areas. Any smoke intrusions into these areas from prescribed burning are anticipated to be light and of short duration.

Prescribed burning would be scheduled primarily during the period starting in January and ending in June. This treatment period minimizes the amount of smoke emissions by burning when duff and dead woody fuel have the highest moisture content, which reduces the amount of material actually burned. Broadcast burning, handpile burning, and underburning would also be planned during the winter and spring months to reduce damage to the site from high intensity burning and to facilitate control of the units being burned.

The greatest potential for smoke intrusions into the non-attainment areas would come from underburning activities. Current avoidance strategies for prescribed fire assumes that smoke can be lifted from the project site and dispersed and diluted by transport winds. However, underburning requires a low intensity burn that would not have the energy to lift the smoke away from the project site. Smoke retained on site could be transported into portions of non-attainment areas if it is not dispersed and diluted by anticipated weather conditions. Localized concentration of smoke in rural areas away from non-attainment areas may continue to occur during prescribed burning operations.

Transportation System

The proposed management activities that are likely to have the greatest effect on the transportation system within the CSNM are road closures and road decommissioning. The degree to which these activities affect transportation by vehicle varies by alternative. Most of the proposed road changes are located south of State Highway 66. Table 4-25 shows the proposed management activities that would affect the transportation system. Maps 31, 32, and 33 show individual roads with proposed management activities.

Table 4-25. Proposed Management Activities to the Transportation System

Activities	A*	B	C	D
Mechanical Decommission	0 miles	0 miles	24 miles	52 miles
Natural Decommission	0 miles	49 miles	28 miles	6 miles
Improve Drainage and Block Road to the Public	77 miles	28 miles	21 miles	12 miles
Improve Road and Leave Open	0 miles	3 miles	0 miles	3 miles
Block Road to Public	0 miles	3 miles	4 miles	7 miles
TOTAL (miles)	77	83	77	80

***Under interim management (Alternative A), all motorized and non-motorized mechanized travel is prohibited on the Schoheim road (BLM road 41-2E-10.1) and temporarily restricted on roads leading to it (see Plate 1) as a result of the designation of the CSNM. Persons who are exempt from the prohibition are: 1) Any federal, state, or local officers engaged in fire, emergency and law enforcement activities; (2) BLM employees in official duties: (3) persons authorized to travel on designated routes by the Monument Manager (or designee). Other roads were temporarily closed through the RMP process (since 1995) accounting for the miles identified. The restrictions will remain in effect until the implementation of the CSNM Resource Management Plan/ Record of Decision. The planning process may result in a decision to maintain or partially modify this prohibition.**

Recreational Use

A perspective to keep in mind when reviewing this section is that the Monument was not proclaimed for recreation reasons. Recreation use is secondary to the purpose of the Monument and as a result recreational uses are restricted as compared to past use levels.

Mechanized Recreation

Mechanized recreation includes all motorized vehicles, including snowmobiles, and human powered transportation devices including, but not limited to, mountain bikes, game retrieval carts, skate boards and even in-line skates.

The current level of cross-country vehicle use within the Monument is low, due to the relative isolation of the area from population centers, limited winter access, and the terrain and vegetation. The only legal public access route to Agate Flat was from Pilot Rock across the Schoheim Road. All existing roads and the Agate Flat area as a whole, receive moderate use during big game hunting seasons and the majority of cross country travel occurred in Agate Flat during this time.

Under all alternatives the existing OHV closure within the Congressionally designated Pacific Crest National Scenic Trail (PCNST) will continue.

For all recreation activities, Alternative A is the existing situation as designated by the RMP with the wording of the Proclamation applied. This Alternative is designed to protect the lands included in the Proclamation until a management plan is written.

Under all alternatives, all forms of mechanized recreation are restricted to roads designated for public access. The Proclamation closed the entire Monument to cross country travel by motorized and mechanized equipment, and restricted their use to roads designated for public access. Refer to the transportation system section for road closures.

Under Alternatives C and D, existing roads could be designated for non-motorized recreational uses in the future and under Alternative D new roads could be constructed in the future for these uses.

All these alternatives will have a negative effects on mechanized use of the Monument, with Alternatives A and B having the greatest negative impact. Alternatives C allows for new designations, which is less restrictive than Alternatives A or B. Alternative D allows for new designations and new construction is the least restrictive of the alternatives.

Non-Mechanized Recreation

Non-mechanized recreation includes, but is not limited to, hiking, camping, fishing, backpacking, picnicking, rock climbing, hunting, horseback riding, hang gliding, and para-sailing. Recreational animal stock use will be addressed separately.

Under all alternatives, the PCNST and the two associated side trails are the only designated trails within the Monument. Under Alternative A, no new hiking trails would be constructed pending completion of this Plan, but hiking would be allowed throughout the Monument. Under Alternative B, no new hiking trails would be constructed anywhere within the Monument and hiking in the Oregon Gulch and Scotch Creek RNAs would be confined to existing roads and trails. Alternative C allows for new hiking trail designation and construction in the future but only within the primary visitor use zones (see map 42). As in Alternative B, hiking within the RNAs would be restricted to existing roads and trails. Alternative D allows for the designation and construction of new hiking trails across the Monument except within the WSA and RNAs. As in Alternatives B and C, hiking within the RNAs would be confined to existing roads and trails. Under all alternatives, cross-country hiking (off of designated trails), would be allowed with the exception of the RNAs.

Alternative B would have the greatest negative impact on hiking with no new trail construction or designations. Alternative A would have the next greatest impact with no new construction considered until the CSNM Resource Management Plan is completed. Alternative C is the next restrictive with new designation or construction allowed in the designated visitor use concentration zones, and Alternative D would have the least negative impact on hiking. Although these alternatives appear to have a negative impact on hiking, there were no proposals for new trail construction or designation within the Monument before the Proclamation, so the magnitude of the negative impact is relatively low.

Camping would be allowed under all alternatives but with the following restrictions; under Alternative A, camping would be allowed throughout the Monument as would campfires. Under Alternative B, camping would only be allowed at the Hyatt Lake Recreation Complex (HLRC) designated campsites, and no trace dispersed camping would be allowed along the PCNST. Campfires would only be allowed in designated fire pits at the HLRC. Dispersed "no trace" camping would be allowed across the entire Monument in Alternative C with the exception of the RNAs and structures on the former Box-O Ranch which would be closed to camping. Campfires would be allowed across the Monument except within the RNAs where they are prohibited. Organized groups with existing permits would be allowed to camp outside of the HLRC as long as their permit is valid and renewal of the permit is a possibility. No new applications for group camping outside of the HLRC would be accepted. Group camping for administrative purposes would be allowed.

Alternative D would allow dispersed "no trace" camping across the Monument except for the RNAs and structures on the former Box-O Ranch, just like Alternative C. Organized groups with existing permits would be allowed to camp and apply for renewal as in Alternative C but a limited number of new applications for group camping outside of the HLRC would be considered. As in Alternative C, campfires would be allowed across the Monument except within the RNAs. As in Alternative C, group camping for administrative purposes would be allowed.

Alternative A, by allowing camping and campfires throughout the Monument, would have no effect on these activities since it is the existing situation. Alternative B would be the most restrictive by allowing camping and campfires only at the HLRC. Alternative C is more restrictive than A and less restrictive than B since it allows for existing organized group camping outside of the HLRC. Alternative D is less restrictive than C since it also allows for new group camping applications as well as allowing existing permits to continue, and it is more restrictive than Alternative A. In summary, the order of greatest negative impact to least negative impact would be B, C, D, then A.

Activities such as technical rock climbing, hang-gliding, or para-sailing would be allowed under Alternative A with no restrictions. Alternative B, on the other hand, would not allow these activities anywhere within the Monument. Alternative C would not allow technical rock climbing within the Monument, but hang-gliding and para-sailing would be allowed by permit only and only in an area designated by the Monument planning staff after analysis of the application. Alternative D would allow technical rock climbing on Pilot Rock only, and hang-gliding and para-sailing would be allowed throughout the Monument except for the WSA and RNAs.

For these activities, Alternative A would have no negative impact since it does not restrict these activities at all. Alternative D would be more restrictive than A but less than C or B, and Alternative C would be more restrictive than Alternatives A or D and less restrictive than B. There are no documented occurrences of these activities taking place in the Monument to date, so although these Alternatives might have a negative impact on paper, they have no negative impacts on existing uses, just potential uses.

Recreational Animal Stock Use

Alternative A would allow stock use throughout the Monument except within the RNAs. Commercial recreational stock use for recreational purposes (Special Recreation Permits, or SRPs) would not be considered until the Monument Management Plan is completed. Alternative B would not allow this use anywhere within the Monument. Alternative C would allow recreational stock use within the Monument except within the RNAs where it would be prohibited. The number of stock per group would be 4 animals on overnight trips and 6 animals on day trips. On overnight trips, animals must be tethered at least 200 feet from any water's edge. From November 15 to May 1, animal stock use will not be allowed in the South Management Zone (see map 42). There would be no Special Recreation Permits issued for commercial activities using animals. Alternative D would also prohibit stock use within the RNAs but the number of animals allowed on trips would be increased to 8 animals on overnight trips and 12 animals on day trips. The animals must be tethered at least 100 feet from any water's edge on private overnight stays and there is no requirement to provide feed for the animals (grazing allowed), but if feed is provided it must be certified weed free. Commercial stock use would be allowed under this alternative but not within the WSA or RNAs. Special Recreation Permits involving animal use would be limited to 3 and these permits would have specific restrictions to ensure protection of the objects within the Monument. Some of these restrictions would include staying on pre-designated routes and using designated campsites. Commercial stock would have to be tethered at least 200 feet from any water's edge and food for commercial stock must be brought in(no grazing), and the feed must be certified weed free. Commercial stock use would not be allowed in the South Management Zone from November 15 to May 1.

There are no current Special Recreation Permits (SRPs) issued for commercial recreation activities within the Monument so impacts to existing permittees are non-existent. Impacts would only be to potential activities in this case.

Since Alternative B would not allow animal stock use, either private or commercial, anywhere within the Monument (except on the PCNST) it would have the greatest negative impact on these activities. Alternative C would be the next most restrictive by not allowing commercial SRPs by restricting use in the South Management Zone, and by the reduced number of stock allowed. Alternative D would be somewhat less restrictive than Alternative C by allowing a limited number of SRPs and by allowing more animals per group.

Impacts to Wilderness Opportunities

The existing BLM Wilderness Study Area (WSA) was delineated based on criteria established in 1978 in the Department of Interior's " Wilderness Inventory Handbook". The Handbook states, for BLM lands to be eligible for consideration as wilderness there must be at least 5000 contiguous roadless acres of public land. The existing Soda Mountain WSA was a result of this inventory. Actions proposed under the transportation section have the potential to change the number of contiguous roadless acres. These acres would not increase the size of the existing WSA, but they could be added to future Oregon wilderness legislation by Congress.

Under Alternatives B, C, and D, where varying sections of the Schoheim Road would be decommissioned, the amount of contiguous roadless acres would increase. Increasing the amount of roadless acres adjacent to the Soda Mountain WSA could increases the amount of area suitable for WSA designation. This could also give Congress the opportunity to expand the wilderness, if they so choose, in the future. The amount of area that may become suitable for WSA designation as a result of increasing the contiguous roadless area varies by alternative. The amount of time to achieve this "roadless acreage increase" would also vary by alternative, with natural decommissioning taking the longest amount of time to achieve a "roadless" condition. Alternative B could increase the area suitable for possible WSA designation by approximately 6,700 acres but these acres would not be suitable for approximately 5 to 10 years as a result of the roads being naturally decommissioned. Alternative C and D could make approximately 7,275 acres of roadless area adjacent to the Soda Mountain WSA suitable for WSA status. Alternatives C and D both implement mechanical decommissioning which would take less time to achieve "roadless" conditions but the amount of decommissioning accomplished is dependent on future funding. If immediate funding is available to implement the proposed decommissioning, approximately 6,700 acres could be suitable for wilderness designation in about 5 years under Alternative C and about 7,275 acres under Alternative D. Alternative C proposes both mechanical and natural decommissioning to accomplish the "roadless" suitability. Approximately 6,700 acres could be suitable in about 5 years as a result of mechanical decommissioning but the remaining 575 acres would not be suitable for about 5 to 10 years as a result of natural decommissioning. Once these areas meet the suitability criteria for wilderness designation they would be managed as WSA.

Land Use Authorizations

Background

The realty program operating under the jurisdiction of the Medford District Office of the BLM is oriented towards public service. Authorizations are the result of applications from the private, commercial, and government sectors. The BLM does not actively solicit or advertise the availability of land use authorizations. However, when applications are received for legitimate uses as chartered under FLPMA, BLM is obligated to accept, process, consider, and ultimately make a decision on these requests. Table 4-26 provides a comparative rating system for the proposed alternatives being addressed in this Plan. They represent a reasoned projection of impacts to the program based on past actions and projected future consequences.

Table 4-26. Land Use Authorization Impacts

Impacts to Environment	Impacts to Private Interests	Impacts to Commercial Interests
Alternative A (No Action)		
Minor to moderate, based on size & extent of authorization	None or Minimal	None or Minimal
Impacts minimized by mitigation using BMP's*	Applications processed & generally approved with environmental mitigation	Applications processed & generally approved with environmental mitigation
Minimal	Existing authorizations renewed upon request and review	Existing authorizations renewed upon request and review
Alternative B		
None	Maximum, due to loss of opportunity for land use authorizations	Maximum, due to loss of opportunity for land use authorizations
None	Maximum, due to no new applications accepted due to land use planning redirection**	Maximum, due to no new applications accepted due to land use planning redirection
None	Maximum, if not renewing existing authorizations	Maximum, if not renewing existing authorizations
Alternative C		
Minimal	Minimal, due to protection under past VERs or for landlocked parties**	Moderate, due to loss of opportunity for land use authorizations
Minimal	Maximum due to no new applications accepted due to land use planning redirection**	Maximum, due to no new applications accepted due to land use planning redirection**
Minimal	Existing authorizations renewed upon request and review	Existing authorizations renewed upon request and review
Alternative D		
Minor to moderate, based on size & extent of authorization	None or Minimal	Favorable or None
Impacts minimized by mitigation using BMP's*	Applications processed & generally approved with environmental mitigation	Applications processed & generally approved with environmental mitigation
Favorable if Communication Site Management Plan is developed, fully implemented and involves all authorized users	Existing authorizations renewed upon request and review	Existing authorizations renewed upon request and review

* Best Management Practices

** BLM would still accept & process applications for access to landlocked private parcels

Minerals

Under all four alternatives, the Federal lands within the Monument are withdrawn from mineral entry under the Mining Law of 1872. However, use of common mineral materials from existing rock quarries varies by Alternative and is discussed below.

Alternative A

Common mineral materials would be available from existing quarries for extraction, processing, and transport for projects approved for administrative (BLM) use. Approved projects would have to mitigate for potential damage to aquatic resources, stream channels, and riparian habitat. If mitigation was not possible, the project would not be approved.

Alternative B

Under Alternative B, common mineral materials from existing quarries within the Monument would not be available for use. Projects within the Monument needing this type of material would have to utilize similar material from alternate sources located outside the Monument. This alternative would shift any potential environmental damage from use of common mineral materials from those federal lands within the Monument to other federal holdings outside the Monument. Potential adverse environmental impacts associated with extraction of common mineral varieties from inside the Monument would be avoided under this Alternative.

Alternative C

Common mineral materials would be available from existing quarries for extraction, processing, and transport for projects approved for administrative (BLM) use. Approved projects would have to mitigate potential damage to aquatic resources, stream channels, and riparian habitat. If mitigation was not possible, the project would not be approved. (Same as Alternatives A)

Alternative D

Common mineral materials would be available from existing quarries for extraction, processing, and transport for projects approved for administrative (BLM) use. Approved projects would have to mitigate potential damage to aquatic resources, stream channels, and riparian habitat. If mitigation was not possible, the project would not be approved (Same as Alternatives A).

Social and Economics

Community Effects

Table 4-27 compares the social and economic effects of the proposed alternatives based on findings from post-designation community interviews conducted by social scientists from the University of Idaho, College of Natural Resources. The social scientists used the themes that emerged from the interviews to guide a comparison of activities within the proposed alternatives. The results of these interviews and more information on the specific themes are presented in Appendix FF.

Table 4-27. A Comparison of Perceived Community Effects of Alternatives Based on Findings from Post-designation Group and Individual Interviews

Issues/Concern	A	B	C	D
Vegetation Management of Diversity Area	• Wildfire risk not satisfactorily addressed. • Negative economic impacts of limited opportunities for noxious weed control compared to all other Alternatives. • Reduced opportunities for ecosystem restoration on public land compared to all other Alternatives. Perceived disincentive for restoration on nearby private land. • Reduced vegetation management job opportunities compared to all other Alternatives	• Increased vulnerability of nearby private property to wildfire compared to Alternatives C and D. Wildfire risk not satisfactorily addressed. • Negative economic impacts of limited opportunities for noxious weed control compared to Alternatives C and D. • Reduced opportunities for ecosystem restoration on public land compared to Alternatives C and D may provide disincentive for restoration on nearby private land. • Reduced job opportunities compared to Alternatives C and D.	• Decreased vulnerability of nearby private property to wildfire compared to Alternatives B. Wildfire risk may be satisfactorily addressed. • Satisfaction with enhanced opportunities for noxious weed control compared to Alternatives B, perceived positive economic impacts. • Enhanced opportunities for ecosystem restoration on public land compared to Alternatives B perceived as incentive for restoration on nearby private land. • Enhanced vegetation management job opportunities compared to Alternatives B. • Pilot projects and effectiveness monitoring could allay skepticism about BLM management efforts. • Greater emphasis on restoration could contribute more positively to amenity and nonmarket values (community attractiveness, wildlife habitat, clean water, biodiversity, etc.) of the community than Alternatives A and B. This is perceival to enhance intrinsic benefits and to have positive economic impacts on local businesses. • Controlled burns address wildfire risk, but also perceived to increase possibility of damage to private property from out of control prescribed burns.	Same as Alternative C but somewhat dependent on the management tools employed to meet objectives.

Table 4-27. A Comparison of Perceived Community Effects of Alternatives Based on Findings from Post-designation Group and Individual Interviews

Issues/Concern	A	B	C	D
Vegetation Management of Old-Growth Emphasis Area	• Wildfire risk not satisfactorily addressed. • Dissatisfaction with limited opportunities for noxious weed control compared to all other Alternatives This is perceived to have negative economic impacts. • Reduced opportunities for ecosystem restoration on public land compared to all other Alternatives Perceived disincentive for restoration on nearby private land. • Reduced vegetation management job opportunities compared to all other Alternatives.	• Increased vulnerability of nearby private property to wildfire compared to Alternatives C and D. Wildfire risk not satisfactorily addressed. • Dissatisfaction with limited opportunities for noxious weed control compared to Alternatives. C and D. This is perceived to have negative economic impacts. • Reduced opportunities for ecosystem restoration on public land compared to Alternatives C and D. Perceived disincentive for restoration on nearby private land. • Reduced vegetation management job opportunities compared to Alternatives C and D.	• Decreased vulnerability of nearby private property to wildfire compared to Alternatives B. Wildfire risk may be satisfactorily addressed. • Enhanced opportunities for ecosystem restoration on public land compared to Alternatives B perceived as incentive for restoration on nearby private land. • Enhanced vegetation management job opportunities compared to Alternatives B. • Greater emphasis on ecosystem restoration could contribute more positively to preservation of amenity and nonmarket values (community attractiveness, wildlife habitat, clean water, biodiversity, etc.) of the community than Alternatives A and B. This is perceived to enhance intrinsic benefits and to have positive economic impacts on local businesses.	• Decreased vulnerability of nearby private property to wildfire compared to Alternatives B and C. Wildfire risk may be more satisfactorily addressed. • Enhanced opportunities for ecosystem restoration on public land compared to Alternatives B and C perceived as incentive for restoration on nearby private land. • Enhanced job opportunities compared to Alternatives B and C in commercial thinning. • Greater emphasis on ecosystem restoration could contribute more positively to preservation of amenity and nonmarket values (community attractiveness, wildlife habitat, clean water, biodiversity, etc.) of the community than all other Alternatives. This is perceived to enhance intrinsic benefits and to have positive economic impacts on local businesses.

Table 4-27. A Comparison of Perceived Community Effects of Alternatives Based on Findings from Post-designation Group and Individual Interviews

Issues/Concern	A	B	C	D
Transportation System	• Negative impact on OHV and other mechanized recreational opportunities due to road closures/ decommissions. However, non-mechanized recreation opportunities may be enhanced. • Negative economic impact due to loss of OHV related expenditures in local community. • Road closures/ decommissions perceived to have negative impact on fire fighting capabilities. • Perceived reduction of risk of accidental fires by reducing public access through road closures/ decommissions.	• Same as A. In addition: • Fewer opportunities for jobs than Alternatives C and D related to road decommissioning or improvement. • Reduction in recreation opportunities from restricted access to Pilot Rock more so than Alternatives C and D. Perceived negative economic impacts. However, amenity and nonmarket values may be enhanced. • Perceived lesser potential for habitat restoration through natural decommissioning projects, than Alternatives C and D. Amenity and nonmarket values may be enhanced, but less so.	• Same as A plus: • Fewer opportunities for jobs than Alternatives D related to road decommissioning or improvement • Restricts access to Pilot Rock more so than Alternatives D (but less than Alternatives B), which will reduce recreation opportunities. Perceived negative economic impacts. However, amenity and nonmarket values may be enhanced. • Greater potential for habitat restoration through mechanical decommissioning projects than Alternatives B. Enhances protection of amenity and nonmarket values (community attractiveness, wildlife habitat, clean water, biodiversity, etc.).	• Same as A plus: • More opportunities for jobs than all other Alternatives related to road decommissioning or improvement. • Provides greater access to Pilot Rock than all other Alternatives which will increase recreation opportunities. Amenity and nonmarket values may be reduced. • Improved road access compared to Alternatives B and C may encourage more tourist visitation. Perceived positive economic impact. • Alternatives C and D have greater potential for habitat restoration through mechanical decommissioning projects than Alternatives B. Enhances protection of amenity and nonmarket values (community values, wildlife habitat, clean water, biodiversity) • Paving of Soda Mtn. Road will improve access to PCNST, thus increasing recreation opportunities. Perceived positive economic impact. • Perceived negative impact due to local residents (increased visitation resulting in increased traffic, trespassing, private property damage, and risk of accidental fire.

Table 4-27. A Comparison of Perceived Community Effects of Alternatives Based on Findings from Post-designation Group and Individual Interviews

Issues/Concern	A	B	C	D
Special Forest Products	• Greater protection of amenity and nonmarket values (community attractiveness, wildlife habitat, clean water, biodiversity, etc.) than Alternatives C and D.	• Greater protection of biodiversity and amenity and nonmarket values (community attractiveness, wildlife habitat, clean water, biodiversity, etc.) than all other Alternatives	• Less protection of amenity and nonmarket values (community attractiveness, wildlife habitat, clean water, biodiversity, etc.), than Alternatives A and B.	• Less protection of amenity and nonmarket values (community attractiveness, wildlife habitat, clean water, biodiversity, etc.), than Alternatives A and B.
Mechanized Recreation	• Dissatisfaction with lack of opportunity for off-road non-motorized mechanized recreation for local residents or tourists. • Perceived negative economic impact due to lost revenue from tourists. • Protection of amenity and nonmarket values enhanced. Perceived as positive.	• Same as A.	• Compared to Alternatives A and B, provision of future options to enhance recreation opportunities for local residents and tourists perceived as positive. • Perceived positive economic impact due to increased revenue from tourists. • Compared to Alternatives A and B, greater potential negative impacts to amenity and nonmarket values that are perceived as important. • Perceived negative impact due to increased visitation resulting in increased traffic, trespassing, private property damage, and risk of accidental fire.	• Same as C.

Table 4-27. A Comparison of Perceived Community Effects of Alternatives Based on Findings from Post-designation Group and Individual Interviews

Issues/Concern	A	B	C	D
Non-mechanized Recreation	• Allows greatest opportunity for non-mechanized recreation opportunities compared to all other Alternatives perceived as both positive and negative. • Positive economic impact due to potential to attract non-motorized tourist revenue. • Negative impact due to increased visitation resulting in increased traffic, trespassing, private property damage, and risk of accidental fire. • Greatest potential negative impacts to amenity and nonmarket values that are perceived as important.	• Dissatisfaction with lack of non-mechanized recreation opportunities compared to all other Alternatives • Negative economic impact due to low potential to attract non-motorized tourist revenue compared to all other Alternatives • Greatest potential positive impacts, compared to all other Alternatives, to amenity and nonmarket values that are perceived as important.	• Allows greater non-mechanized recreation opportunities compared to Alternatives A and B, but less than Alternatives D. • Positive impact due to greater protection than Alternatives D to amenity and nonmarket values that are perceived as important.	• Provision of greater non-mechanized recreation opportunities than all other Alternatives perceived as both positive and negative. • Positive economic impact due to potential to attract non-motorized tourist revenue. • Negative impact due to potential decrease in amenity and nonmarket values that are perceived as important. • Negative impact due to increased visitation resulting in increased traffic, trespassing, private property damage, and risk of accidental fire.

Table 4-27. A Comparison of Perceived Community Effects of Alternatives Based on Findings from Post-designation Group and Individual Interviews

Issues/Concern	A	B	C	D
Animal Stock Use	• Availability of animal stock recreation opportunities perceived as positive.	• Dissatisfaction with loss of all stock use opportunity for recreational or other purposes. • No option for local stock-related job opportunities.	• Availability of animal stock recreation opportunities perceived as positive. • Negative economic impact due to loss of possible revenue from commercial stock operations as compared to Alternatives D, but more positive than Alternatives A or B. • Greater protection of amenity and nonmarket values that are perceived as important than Alternatives D. • No option for local stock-related job opportunities. • Negative impact to local residents due to increased visitation resulting in increased traffic, trespassing, private property damage, and risk of accidental fire.	• Availability of animal stock recreation opportunities perceived as positive. • Positive economic impact due to greatest possible revenue from commercial stock operations compared to all other Alternatives • Least protection of amenity and nonmarket values that are perceived as important than all other Alternatives • Positive economic impact due to increase in local stock-related job opportunities. • Negative impact to local residents due to increased visitation resulting in increased traffic, trespassing, private property damage, and risk of accidental fire.

Table 4-27. A Comparison of Perceived Community Effects of Alternatives Based on Findings from Post-designation Group and Individual Interviews

Issues/Concern	A	B	C	D
Visitor Facilities	• All current accommodations available for visitors.	• Dissatisfaction with lower amount of accommodations available for visitors compared to Alternatives C and D, resulting in negative economic impacts due to reduction in tourist revenues. • Negative impact to local residents due to increased visitation resulting in increased traffic, trespassing, private property damage, and risk of accidental fire. • Slightly negative impact due to potential decrease in amenity and nonmarket values that are perceived as important.	• Lower amount of accommodations available for visitors compared to Alternatives D, but more than Alternatives A and B. • Greater emphasis on visitor facilities could result in fewer tourists trespassing on private property compared to Alternatives A and B. • Negative impact to local residents due to increased visitation resulting in increased traffic, trespassing, private property damage, and risk of accidental fire. • Increased signage perceived as positive in terms of resource protection and reduction of tourist trespass on private property, but negative in terms of aesthetics. • Slight to moderate negative impact due to potential decrease in amenity and nonmarket values that are perceived as important. Impacts are less than Alternatives D, but greater than Alternatives A and B.	• Higher amount of accommodations available for visitors compared to Alternatives B and C, which could result in possible increase in tourist revenues. • Greater emphasis on visitor facilities could result in fewer tourists trespassing on private property compared to Alternatives A and B. • Negative impact to local residents due to increased visitation resulting in increased traffic, trespassing, private property damage, and risk of accidental fire. • Increased signage perceived as positive in terms of resource protection and reduction of tourist trespass on private property, but negative in terms of aesthetics. • Moderate negative impact due to potential decrease in amenity and nonmarket values that are perceived as important.

Environmental Justice

Executive Order 12898 of February 11, 1994 as amended by Executive Order 12948 provides that "each federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health and environmental effects of its programs, policies, and activities on minority populations and low-income populations." Environmental Justice "is achieved when everyone, regardless of race, culture, or income, enjoys the same degree of protection from environmental and health hazards and equal access to a healthy environment in which to live, work, and play" (Whorton and Sohocki 1996). The management actions, directions and strategies in this proposed Plan comply with Executive Order 12898 as amended and there will be no disproportionately high effects on minority, low-income populations or Indian Tribes as a result of the proposed management alternatives.

Monument Designation Effects

A literature review was conducted with the intent of shedding light on the possible effects that the designation the CSNM might have on the local communities in terms of their economic and social make-up. This review of the literature has been purposely limited to publications relevant to the management goals and size of CSNM and specifically to the effects of designation on local communities. For example, publications devoted to the effects on local communities of large, brand name, industrial tourism sites such as Yellowstone National Park were considered irrelevant due to the extreme differences in scale and magnitude from CSNM and were excluded from this review on that basis. However, the management goals of CSNM are more consistent with those of wilderness and/or roadless areas in the West, and the extensive literature on the effects of these areas was included. The literature on this subject is vast, and this review is an attempt to present the most relevant conclusions and empirical findings, while at the same time avoiding unnecessary redundancy of repeating similar findings. The results of the literature review are listed on Table 4-28.

Table 4-28. Literature Review relating to Monument Designations

Author(s)	***Findings/ Conclusions***
Effects on the Local Economy	
ECONorthwest, 2000	The number of jobs in the extractive sector in Oregon is declining and is expected to continue to decline in the future. Employment impacts from designation of the Siskiyou Wild Rivers National Monument represent initial, or short-term impacts, which overstate the true employment consequences of the designation in the long run. Estimated number of jobs created by a 3 percent increase in tourism to the area would be 210, and the large majority would be in the low-skill, low-wage service sector.
Miles, 2000	Visitation to three national parks in the Pacific Northwest is highly seasonal, and these parks have not greatly stimulated growth in gateway communities, as was the case at some national parks in other areas. Weather, terrain, adjacent public lands, wilderness qualities and management emphasis (and the lower-spending users they attract), and timber culture of the region (which may result in a slow to embrace tourism development attitude) all contribute to constraints on tourism development.
Rudzitis and Johnson, 2000	Designation has effect of reducing/eliminating extractive industries from the area, but amenities offered by wildlands attract tourists, businesses, and new residents. This increases population, visitor spending, incomes, and the local tax base.
Power, 2000	The study found that, based on the evidence, formerly timber-dependent communities in Washington stand to benefit far more, economically, if roadless National Forest lands in their community are left intact and protected than if these areas are opened to new roads and timber harvests. Given that high quality living environments can attract new residents and economic activity, the attractiveness of a community in terms of its social, cultural, and natural environments is an important part of its economic base and source of economic vitality. This has allowed people's and firms' location decisions to be based more on their preferences for what they perceive to be higher quality living environments.
Southwick and Associates, 2000	Extractive industries play an increasingly small role in job creation and income generation in Oregon. Economic sectors that benefit from the presence of environmental amenities and protected areas, such as tourism and retirement, are increasingly important sources of economic growth in Oregon. Counties with the highest proportion of land in protected areas (wilderness, national parks, and national monuments) are growing the fastest. Protecting lands from extractive activities does not result in slower income and employment growth. It may not be designation itself that causes economic growth, as such transactions are only a paper transaction. Instead, the presence of amenities such as scenery, recreational opportunities, and knowing these amenities are protected, may be enough to attract tourists and retirees, and to encourage businesses to relocate nearby thus strengthening and diversifying local economies.
Lerner and Pool 1999	Parks and open space create a high quality of life that attracts tax-paying businesses and residents to communities. Open space boosts local economies by attracting tourists and supporting outdoor recreation.

Table 4-28. Literature Review relating to Monument Designations

Author(s)	***Findings/ Conclusions***
Duffy-Deno, 1998	Found no evidence that federal wilderness is directly or indirectly associated with either population-density or total-employment-density growth between 1980 and 1990, suggesting that wilderness designation may cause, on average, little aggregate economic harm to county economies. Also found no empirical evidence that county-level resource-based employment is adversely affected by the existence of federal wilderness.
Power, 1996	Empirical analysis shows that mining, timber, and agriculture make a much more modest contribution to local economies than is usually assumed. During a period of decline in extractive sectors, many "extractive-dependent" communities experienced rapid economic expansion in non-extractive sectors.
Rudzitis, Hintz, and Watrous, 1996	Among the fastest growing counties in the nation are those adjacent to federally designated wilderness areas. The population of wilderness counties increased six times faster than the national average for other non-urban counties in the 1980s, and nearly twice as fast as other non-urban counties in the West. A similar trend was found in population for counties near national parks.
Synder, Fawson, Godfey, Keith, and Lilicholm, 1995	The economic gains from recreation appear to be inconsequential and probably would not offset the economic losses associated with wilderness designation. Nonmarket benefits of wilderness designation were not considered.
Effects of Tourism on Local Communities	
ECONorthwest, 2000	The publicity surrounding the designation of new national monuments by Clinton in January of 2000 increased awareness of national monuments in general, and of those designated. It is likely a result of this recent publicity that new visitors will be attracted to monuments across the U.S.
Lankard and McLaughlin, 1999	The cultural heritage tourist "niche-market" is fast becoming a focus of national, state and regional tourism efforts. The profile of a cultural heritage tourist includes: primarily upper-income, college educated, includes multiple destinations in their travel, stays an average of one-half day longer, and spends an average of $65 more per day.
Rogers, 1999	Most of the visitor groups (58%) spent less than a day at the park. Of those groups that spent less than a day at the park, 49% spent four hours or less. The most common activities were the scenic drive (85%), visiting geological geothermal features (71%), photography (57%), hiking 2 hours or more (51%), and hiking less than 2 hours (45%). The average visitor group expenditure within fifty miles of Lassen Volcanic NP was $206. Of the total expenditures by groups within fifty miles of Lassen Volcanic NP, 43% was for lodging, 27% was for food, 15% was for travel, and 15% was for other expenses.
Hoffman and Mecham, 1998	The median visitor group (average of 5 persons) expenditure within 50 miles of Whiskeytown NRA was $34.50. Of the total expenditures by groups within 50 miles of Whiskeytown NRA, 58% was for food, 29% was for travel, and 13% was for "other" items, such as recreation, film, and gifts.

Table 4-28. Literature Review relating to Monument Designations

Author(s)	***Findings/ Conclusions***
Lerner and Pool, 1999	Outdoor recreation represents one of the most vigorous growth areas in the U.S. economy, and much of this is supported by public and private parks and open land.
Power, 1996	In most communities the primary economic relationship between amenities, such as protected landscapes, and the local economy is not likely to be tourism.
Littlejohn, 1994	Most visitors (59%) spent less than one day in the park; 25% spent two or three days. They participated in sight-seeing (91%), walking hiking two hours or less (64%), wildlife bird viewing (39%), picnicking (36%), and beachcombing (34%). The average per capita expenditure was $45. The greatest proportion of their expenditures was spent for lodging (37%), followed by food (33%).
McCool and Martin, 1994	Tourism can bring changes to communities, such as a general disruption of residents' lives owing to increased population during the tourist season, increases in crime, displacement of residents by new developments, conflict in values, and impacts on the local culture. Individuals highly attached to their (tourism-developed) communities are newcomers and viewed the benefits of tourism more positively than less attached individuals, suggesting that these individuals themselves are tourists who have settled in these places.
Allen, Hafer, Long, Perdue, 1993	Proposed that rural communities with low tourism development and low economic output, or high tourism development and high economic output, have favorable attitudes towards tourism development. The former eagerly anticipate economic benefits from tourism development, while the latter have already realized some of the benefits. Rural communities with mixed levels of tourism development and economic output are less supportive of efforts to develop tourism opportunities.
Murphy and Keller, 1990	Touring vacationers are mobile because they bring their own transport and the destination-oriented tourist either arrives by car or can hire one at the destination. Found that tourists travel a great deal within a destination region.
Perdue, Long and Allen, 1987	Perceived impacts of tourism, positive and negative, increase with increasing levels of tourism, up to a threshold. When more than 30% of economy is derived from tourism, there is little additional change.
McCool, 1985	Study of Rattlesnake National Recreation Area and Wilderness visitation before and after designation found no effect of designation on visitation, suggesting that designation does not inevitably lead to increases in recreation use. Postulates that other factors, such as media attention, could influence visitation more than designation itself.

Table 4-28. Literature Review relating to Monument Designations

Author(s)	*Findings/ Conclusions*
Effects on Social Change in Local Communities	
Rudzitis and Johnson, 2000	Along with new residents and businesses come new values, customs and cultures. Increased population can lead to more congestion, crime and housing shortages.
Fortin and Gagnon,1999	In a newly protected area in Quebec, Canada, local use of public lands within the protectal area decreased after designation. For example, prohibitions on recreational and economic use, curbs on spontaneous local use of the area, and increased police and warden presence all reduced local use of the area.
Nelson, 1997	Change is inevitable in the wake of rapid in-migration. It is highly likely that cultural values and political ideology contribute to restructuring in the non-metropolitan West.
Brown, 1993	Population growth in a rural area of Utah led to decreased levels of community satisfaction for old-time residents.
Freudenberg, 1982	As newcomers with different sets of politics, different economic means, and different experiences moved to rural areas, the social diversity of these low-populated communities increased substantially, and traditional power structures changed. Newcomers often present a challenge to traditional political and social fabrics in rural communities and held opinions about the future of the community that directly contradicted that of old-time residents. Some newcomers challenged traditional political and social norms. Social disruption resulted.
Rank and Voss, 1982	New rural immigrants with higher socioeconomic status were more likely than other groups to become involved in community affairs. In the process, they may clash with other residents, and disrupt some community organizations.
Schroeder, 1992	Non-economic benefits of park-related tourism to local communities include support for cultural and natural area preservation, and encouragement of community pride as a result of being recognized by outsiders as interesting and worthy of protection.
Intrinsic Value/ Nonmarket Values	
ECONorthwest, 2000	The intrinsic character of the forests, and the species that inhabit them, make important contributions to the overall economic well-being of those who care about such things and the proposed national monument with associated logging restrictions can create economic benefits by reinforcing this well-being. For some environmental issues, such as maintaining the biodiversity, intrinsic values may be very large.
Power, 2000	Non-commercial forest values (clean drinking water, healthy watersheds for fish and wildlife, recreational opportunities, scenic beauty, open space, and climate stabilization) are critical to the economic well-being of families in counties with substantial tracts of National Forest land.
Lerner and Poole, 1999	Open space conservation is often the cheapest way to safeguard drinking water, clean the air, and achieve other environmental goals.
Power, 1996	America's forested landscapes have economic value simply for the environmental goods and services that flow from them.

Table 4-28. Literature Review relating to Monument Designations

Author(s)	***Findings/ Conclusions***
Effects on Cooperation Between Local Communities and Federal Land Agencies	
Solecki, 1994	During the implementation phase of protected area establishment in the western USA, community concerns and reactions may include the following: fear of losing local autonomy; private landowner objections; lack of local political commitment and or administrative capacity; and problems between agencies operating in the area (not) cooperating.
Carroll, 1988	The tone of community-agency relationships is largely dependent on the willingness and ability of agency managers to develop linkages to the community based upon face-to-face interaction with community members. There is a relatively brief window of opportunity after designation to develop a trusting, interactive community-agency relationship. Once poor relations become established, they are stubbornly persistent.

The bulk of the literature concerns the economic effects of protected area designation and concentrates on the opportunity costs in terms of shutting out extractive industries (collectively defined as mining, manufacturing, and agriculture) and/or the potential benefits in terms of increased tourism and in-migration. Some studies also refer to the nonmarket benefits provided by protected areas. Few studies have been done specifically on the social impacts of protected area designation.

Designation has the effect of impacting the extractive industry sector. However, the number of jobs in the extractive sector has been declining in Oregon and this trend is expected to continue regardless of future designations. The literature suggests that protected area designation causes little aggregate harm at the community level or indeed provides an economic boost. In the West, during a period of decline in the extractive sector, many "extractive-dependent" communities experienced rapid economic expansion in the non-extractive sectors. A study by Power (2000) found that formerly timber dependent communities in Washington stand to benefit far more, economically, if roadless National Forest lands in their community are left intact and protected than if these areas are opened to new roads and timber harvests. In fact, among the fastest growing counties in the nation are those adjacent to federally designated wilderness areas. However, these economic studies use county level data which may mask the adverse economic effects felt at the local level.

The growth associated with protected areas is generated by the presence of natural amenities such as attractive scenery, recreational opportunities, the presence of wildlife, clean air and water, and other traits associated with protected areas. "These amenities tend to attract tourists, retirees, recreationists, and entrepreneurs who desire to visit or relocate near such areas knowing the amenities are protected and will remain available into the future" (Southwick Associates 2000). These people bring new sources of income, which then creates new jobs in the area, which can strengthen and diversify the local economy. The majority of new jobs and businesses typically come in the service sector.

Increased levels of tourism can be one result of protected area designation. Outdoor recreation is one of the most vigorous growth areas in the U.S. economy, and the recent designation of new national monuments by President Clinton has heightened awareness of national monuments in general. This publicity may lead to increased visitation.

Because of the important social changes associated with increased visitation mentioned above, and to help predict possible post-designation visitation to CSNM, National Park Service data on annual visitation were analyzed for similar newly designated NPS areas in the years after designation. With respect to monuments, the last president before Clinton to use the Antiquities Act to designate a monument was Jimmy Carter, and all of his were in Alaska. Before that it was Lyndon B. Johnson. This means that most monument designations were quite a long time ago, making for poor comparison with Cascade-Siskiyou National Monument. Also, visitor statistics were only available from 1979 onward. Analysis was therefore limited to designations from 1978 onward.

There were, however, various other congressional designations of parks, monuments, preserves, national recreation areas, and scenic & recreational rivers that may be informative. These areas were included in the analysis if they met the following criteria: 1) natural area designation (as opposed to cultural/historic); 2) within approximately the last 20 years; 3) where visitation statistics were available in the years immediately after designation. Many areas were eliminated because visitor statistics were not available for the years after designation.

Six different areas that met the above criteria and included in the analysis are (see Table 4-29):

- Chattahoochee River NRA (1978)
- Upper Delware Scenic & Recreational River (1978)
- Great Basin National Park (1986)
- El Malpais National Monument (1987)
- Petroglyph National Monument (1990)
- Mojave National Preserve (1994)

There were a few others, like Mount St. Helens, but various extenuating circumstances (i.e., volcanic explosion) made these data of limited comparative usefulness.

Table 4-29. Recent National Park Service Unit Designations and Visitation in the Years After Designation

NPS Unit (year designated)	Year	Recreation Visits	% Annual Increase	Avg. Annual % Increase
Chattahoochee River NRA	1978	no data	no data	
Chattahoochee River NRA	1979	no data	no data	
Chattahoochee River NRA	1980	345,956	1st year	
Chattahoochee River NRA	1981	471,051	26.56%	
Chattahoochee River NRA	1982	665,192	29.19%	
Chattahoochee River NRA	1983	1,081,924	38.52%	31.42%
Upper Delware Scenic & Recreational River	1978	no data	no data	
Upper Delware Scenic & Recreational River	1979	no data	no data	
Upper Delware Scenic & Recreational River	1980	77,764	1st year	
Upper Delware Scenic & Recreational River	1981	156,437	50.29%	
Upper Delware Scenic & Recreational River	1982	106,502	-46.89%	
Upper Delware Scenic & Recreational River	1983	223,096	52.26%	18.56%
Great Basin National Park	1986	40,359	1st year -	
Great Basin National Park	1987	63,532	36.47%	
Great Basin National Park	1988	73,559	13.63%	
Great Basin National Park	1989	70,259	-4.70%	
Great Basin National Park	1990	65,026	-8.05%	
Great Basin National Park	1991	63,864	-1.82%	7.11%
El Malpais National Monument	1987	no data	no data	
El Malpais National Monument	1988	23,546	1st year	
El Malpais National Monument	1989	52,554	55.20%	
El Malpais National Monument	1990	78,993	33.47%	
El Malpais National Monument	1991	69,119	-14.29%	
El Malpais National Monument	1992	75,916	8.95%	20.83%
Petroglyph National Monument	1990	no data	no data	
Petroglyph National Monument	1991	no data	no data	
Petroglyph National Monument	1992	68,065	1st year	
Petroglyph National Monument	1993	66,870	-1.79%	
Petroglyph National Monument	1994	85,869	22.13%	
Petroglyph National Monument	1995	88,196	2.64%	7.66%
Mojave National Preserve (1994)	1994	no data	no data	
Mojave National Preserve	1995	no data	no data	
Mojave National Preserve	1996	no data	no data	
Mojave National Preserve	1997	378,977	1st year	
Mojave National Preserve	1998	374,378	-1.23%	
Mojave National Preserve	1999	391,694	4.42%	0.64%
Mojave National Preserve			OVERALL	14.37%

Source: National Park Service Visitation Database Reports - http://www2.nature.nps.gov/npstats/[illegible].cfm

Within each unit, huge variability in visitation, especially in the first few years after designation, suggest problems with both the validity and reliability of the data. Visitation to parks, monuments, and other types of protected areas may be affected by seasonal patterns of visitation, differing types of attractions and visitor facilities, proximity to other points of interest, pubic notoriety, and other factors that make each area unique. Although these data have limitations, there are several conclusions that can be drawn.

- *Percent annual increase* in visitation increases in the 5 years after designation ranged from -47% to +55%.
- In comparing the units, *average annual % increase* over the five years after designation ranged from 1% to 31%.
- The *average annual increase overall*, across all five years and all units, was 14%.

These patterns suggest that in the years after designation, while visitation will likely fluctuate, a modest increase is likely to occur. The proportion of the increase associated with designation, as opposed to increases that would have occurred without designation, is unknown.

Since CSNM is located in between several other popular National Parks and Monuments including Crater Lake, Lava Beds, Redwood, and others (map 40), it is reasonable to expect that some visitors to those areas will visit CSNM, even if it is not their primary destination (Murphy 1990).

It should be pointed out that designation and the new regulations it brings, while attracting new visitors to the area, may also have the effect of reducing use of the area by local residents. A review of visitor surveys from other parks and protected areas in the Pacific Northwest reveals that most visitors spent one day or less in a given area and spend modest amounts, principally on lodging and food.

The Shakespeare Festival held each year in Ashland represents a potential pool of visitors for the CSNM. These visitors are considered part of the "cultural heritage niche-market," who stay on average a half-day longer in an area and spend an average of $65 per day more than other tourists. This market along with travelers of the I-5 corridor represent untapped markets that the Monument could target. Some use by these markets is likely to occur simply because of their proximity to the area, regardless of actions taken by the BLM.

Tourism and in-migration due to amenity attraction can bring changes to the local communities. Among the possible effects are a general disruption of residents' lives owing to increased population during the tourist season, increases in crime, congestion, displacement of residents by new developments, housing shortages, conflict in values, and impacts on the local culture.

The benefits of preserving intrinsic or nonmarket values associated with protecting wildlands can be significant. Among these values cited in the literature as important to communities are clean drinking water, healthy watersheds for fish and wildlife, recreation opportunities, scenic beauty, open space, climate stabilization, and encouragement of local pride.

Cooperation between the land management agency and the local population can be affected by designation. Community concerns during the implementation phase of protected area establishment may include fear of losing local autonomy, private landowner objections, lack of local political commitment, and problems between agencies operating in the area not cooperating. A study by Carroll (1988) found that there is a relatively brief window of opportunity after designation to develop a trusting, interactive community-agency relationship, and that once poor relations are established they are stubbornly persistent.

CHAPTER 5 - CONSULTATION AND COORDINATION

Summary of Scoping

The National Environmental Policy Act (NEPA) ensures that environmental information is available to citizens and public officials before decisions are made and before actions are taken. It also provides a regulatory avenue for private citizens and organizations to express their opinions which may influence the proposed action. Scoping meetings are held early in the planning and decision-making process to establish effective and open communication with the public.

Scoping is an open process designed to determine the breadth of issues to be addressed in the EIS. It is intended to obtain the views of the public; state, local, and tribal governments; and other federal agencies. By involving the public through the scoping process, the proponent develops a comprehensive list of issues, then identifies the significant issues for study, aids in the development of additional alternatives, and ensures that the draft EIS is balanced and thorough.

Scoping also assesses the level of public interest in the project and identifies the agencies, groups, and individuals likely to be most interested in the proposed project. Scoping can have a profound and positive effect on the issues to be examined within the EIS, the environmental analyses, and, ultimately, on the decision made.

The formal scoping period began with publication of the Notice of Intent to produce a Management Plan, which appeared in the Federal Register on July 31, 2000 (Volume 65, No.147, Pg. 46731). Written comments were accepted through August 31, 2000. Although the original intent was to supplement the Cascade Siskiyou Ecological Emphasis Area (CSEEA) Draft Management Plan/Environmental Impact Statement (DMP/DEIS), it became clear that a "stand alone" Cascade-Siskiyou National Monument (CSNM) Resource Management Plan would better serve planning process and the public. There has been a lot of interest in this area since it's unique character was identified in the Medford District Resource Management Plan (USDI 1995a) and numerous public meetings have been held to share information and solicit comments from the public (Appendix MM).

The scoping process invited public input through a letter, sent to adjacent landowners and interested parties, announcing the establishment of the Monument and detailing the planning process. In addition, the CSNM web page provided up to date information on the Monument and solicited public input. All relevant information received during the comment period for the CSEEA DMP/DEIS was incorporated in the planning process.

During the scoping period, 267 letters, cards and e-mails were received. Comments were received from 12 different States. A response from every state north and west of Nevada as well as New York, Massachusetts, and Pennsylvania. An e-mail was received from Parma, Italy with a scoping comment. The majority of comments were from southwest Oregon particularly Ashland and Medford. Form letters or e-mails were submitted by many respondents (174) and three letters had petitions attached. During and after the scoping period, meetings were held with representatives of State and local governments as well as other federal agencies to discuss management of the Monument.

Issues ranging from ecological concerns, to land use, to government control emerged after all letters and comments were catalogue and analyzed. In addition, over one-thousand comments received during the comment period of the Cascade Siskiyou Ecological Emphasis Area Draft Management Plan were analyzed. Those supporting the CSNM designation emphasized protection, preservation and restoration of ecological values. Others raised concerns about restrictions on access to public resources and increased federal government control over public and private lands.

Key Issues and Concerns

At the conclusion of the scoping period, the interdisciplinary team used the scoping comments, comments from the CSEEA Draft EIS, and the Presidential Proclamation to identify key issues and concerns. The key issues were identified and described in Chapter 1, and have been addressed throughout the Plan.

Planning Consistency

The Federal Land Policy and Management Act (FLPMA), Title II, Section 202, provides guidance for the land use planning system of the Bureau of Land Management (BLM) to coordinate planning efforts with Native American Indian tribes, other Federal departments, and agencies of the state and local governments. In order to accomplish this directive, the Bureau of Land Management is directed to keep informed of state, local, and tribal plans; assure that consideration is given to such plans; and to assist in resolving inconsistencies between such plans and Federal planning. The section goes on to state in Subsection (c) (9) that *"Land use plans of the Secretary under this section shall be consistent with State and local plans to the maximum extent he finds consistent with Federal law and the purposes of this Act."*

The provisions of this section of FLPMA are echoed in Section 1610.3 of the BLM Resource Management Planning regulations. In keeping with the provision of this section, state, local and tribal officials were made aware of the planning process through the previously described mailings and meetings. Planning team members also met with local government and maintained communications with tribal officials regarding then CSNM planning process.

According to Section 1610.4-7 of the Bureau of Land Management Resource Planning Regulations, the CSNM Draft Resource Management Plan/Draft Environmental Impact Statement is provided to the Governor, other Federal agencies, state and local governments, and Native American Indian tribes for comment. The resulting comments will be addressed in the Proposed Management Plan. The formal 60-day consistency review by the Governor will occur after the Proposed Resource Management Plan is published, as outlined in 1610.3-2(e) of the BLM Planning Regulations.

BLM planning regulations require that resource management plans (RMPs) be consistent with officially-approved or adopted resource-related plans and the policies and procedures contained thereon, of other federal agencies, state and local governments, and Native American tribes, "so long as the guidance and RMPs are also consistent with the purposes, policies and programs of federal laws and regulations applicable to public lands..."(43 CFR 1610.3-2). Consistency is construed as the absence of conflict. Based on BLM's knowledge of the plans of such other agencies, the DEIS has been compared to the following agencies' plans, for consistency, and BLM has reached the conclusions stated.

Federal Agencies

The Cascade-Siskiyou National Monument was established in southwest Oregon with the southern border along the Oregon/California state line. Although the Monument stops at the state line, the natural resources and natural processes generally occur on a Watershed or Subwatershed basis. Several Subwatersheds of the Klamath River basin are common across the Oregon/California border with the headwaters starting in the Monument. Before the Monument designation, the Cascade Siskiyou Ecological Emphasis Area Draft Management Plan (USDI 2000g) recognized the Horseshoe Ranch Wildlife Area in California as an important part of the natural processes in the Slide

Creek, Scotch Creek and Camp Creek Subwatershed. The lower Jenny Creek Subwatershed in California was also recognized although not associated with the Horseshoe Ranch Wildlife Area. Although the Presidential Proclamation did not recognize the California federal lands along the state line as part of the CSNM, it is clear that the natural resources throughout the entire Subwatersheds should be managed consistently. In order to coordinate management across state line, a Memorandum of Understanding was established among the BLM's Medford District (Oregon), the BLM's Redding Field Office (California) and the California Department of Fish and Game in March of 2001.

This DEIS is believed to be consistent with the following plans of other federal agencies:

- The Record of Decision on the 1994 *Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl.*

- The Record of Decision on the 2000 *Supplemental Environmental Impact Statement for Amendment to the Survey and Management, Protection Buffer, and other Mitigation Measures Standard and Guidelines.*

- The Forest Service's forest wide land and resource management plans for the adjacent Rogue River (1990) and Klamath (1993) National Forest.

- The BLM's Klamath Falls Resource Area Resource Management Plan/EIS (1994)

- Natural Resource Conservation Service watershed plans.

- The Endangered Species Act and the following Fish and Wildlife Service plans:
  - Pacific Bald Eagle Recovery Plan
  - Final Draft Northern Spotted Owl Recovery Plan
  - Fish and Wildlife Service determination of critical habitat for the Northern Spotted Owl
  - Peregrine Falcon Recovery Plan

- The Bonneville Power Administration's latest annual Transmission System Facilities Resource Program.

- The Northwest Power Planning Council, Columbia River Basin, Fish and Wildlife Program, and subordinate species-specific strategies.

State Government

The DEIS is believed to be consistent with the following plans, programs, and policies of the State of Oregon agencies:

- Department of Environmental Quality
  - Smoke Management Plan
  - Visibility Protection Plan and air quality policies
  - Prevention of Significant Deterioration requirements

- Water Resources Department river basin programs for the Rogue and Klamath Rivers

- Water Resources Commission rules and statutes

- Department of Agriculture
  - Weed control plans
  - State-listed endangered plan species

- Division of State Lands
  - Removal - Fill Law
  - Oregon Natural Heritage Program

- Parks and Recreation Department
  - Statewide Comprehensive Outdoor Recreation Plan
  - State Parks and Recreation System Plan
  - State Recreation Trails Plan
  - State Historic Preservation Program
  - State Scenic Waterways Program and related projects

- Department of Transportation, Highway Division
  - Oregon Highway Plan

- Economic Development Department, Regional Economic Development Strategies

Table 5-1. Consistency of Proposed Action Alternatives with State of Oregon Plans

State Plan/Statute	Objective	Consistency of Alternatives
State Planning Goal 5	Open spaces, scenic and historical areas, and natural resources.	All alternatives conform with this goal as priority is given to protection, maintenance, and restoration of the Monument landscape.
Oregon Statutory Wildlife Policy, Revised Statute 496.012	Maintain all species of wildlife at optimum levels and prevent the serious depletion of any indigenous species. Develop and manage the lands and water of the state in a manner that will enhance the production and public enjoyment of wildlife.	All alternatives meet the objectives of this statute. Alternatives C and D could have some short-term affects on population of species dependent on old-growth conifer forest but long-term these species would benefit from these alternatives.
	Develop and maintain public access to the lands and waters of the State and the wildlife resources thereon.	Public access would be limited the most in Alternative D and to lesser degrees in Alternatives C and B.
	Regulate wildlife populations and public enjoyment of wildlife in a manner that is compatible with primary uses of the lands and waters of the State and provide optimum public recreational benefits.	The habitat management in all alternatives will be conducive to most wildlife populations. The northern portion of the Monument will benefit late-successional habitat dependent species and the southern portion will provide a diversity of habitat.
Oregon Threatened and Endangered Species Act	Protect and conserve wildlife species that are determined to be threatened or endangered.	All State species found within the Monument are also federally listed under the Endangered Species Act. The protection of these species is common in all alternatives.
Oregon's Sensitive Species Rule	Help prevent species from qualifying for listing as threatened or endangered	Most species on Oregon's sensitive species list would be well protected under all alternatives.

Table 5-1. Consistency of Proposed Action Alternatives with State of Oregon Plans

State Plan/Statute	Objective	Consistency of Alternatives
Nongame wildlife	Plan to maintain populations of naturally occurring Oregon nongame wildlife at self-sustaining levels within natural geographic ranges in a manner which provides for optimum recreational, scientific and cultural benefits, and where possible, is consistent with primary uses of lands and waters of the State.	Most species on Oregon's nongame wildlife species would be well protected under all alternatives.
Big Game Population Management Objectives	Develop, restore and/or maintain big game (along with associated recreation, aesthetic and commercial opportunities and benefits) at the level identified as the planning target level by game management unit. This is accomplished through hunting season regulation and implementation of multiple-use management practices on public lands that tend to stabilize the cover-forage relationship in space and time, provide for wildlife emphasis in management of sensitive wintering areas, and offer habitat improvement opportunities.	The habitat for big game will be enhanced at differing degrees through the different alternatives as Alternative B would provide the least amount of enhancement opportunities and Alternative D would provide the most. A big game management area is established in this CSNM Plan along the southeastern and southern boundaries (Map 29). This area complements the habitat provided in California by the Horseshoe Ranch Wildlife Habitat Area.
Wild Fish Policy	Protect and enhance wild stocks	All alternatives prioritize the protection of aquatic habitat for wild fish stocks. The Monument Aquatic Conservation Strategy (Appendix BB) provides for optimum protection of aquatic habitat.
Coho, Steelhead and Trout Plans	Maintain and enhance production.	The maintenance and enhancement of aquatic habitat for these species is common in all alternatives. The Monument Aquatic Conservation Strategy (Appendix BB) provides for optimum protection of aquatic habitat.
Basin Fish Management Plans	Establish compatible objectives for management of all fish stocks in each basin. Present tasks for attaining objectives, described unacceptable management strategies, and set priorities on achievement.	The maintenance and enhancement of aquatic habitat for all fish stocks is common in all alternatives. The Monument Aquatic Conservation Strategy (Appendix BB) provides for optimum protection of aquatic habitat.

Table 5-1. Consistency of Proposed Action Alternatives with State of Oregon Plans

State Plan/Statute	Objective	Consistency of Alternatives
Oregon Forest Practices Act Rules	Establish minimum standards which encourage and enhance the growing and harvesting of trees while considering and protecting other environmental resources such as air, water, soil, and wildlife	This Plan establishes Best Management Practices (Appendix AA) and a Monument Aquatic Conservation Strategy (Appendix BB) that provide minimum standards minimum standards for all management activities and is common to all alternatives. Alternative D is the only alternative that promotes harvesting of trees and this would only occur for stand maintenance or restoration. The other alternatives incorporate thinning of small trees for stand maintenance.
Forestry Program for Oregon – Forest Use.	Preserve the forest land base of Oregon. Stabilize the present commercial forest land base. Manage habitat based on sound research data and the recognition that forests are dynamic and most forest uses are compatible over time.	All alternative preserve the conifer forest land and minimizes the conversion of forest land to accommodate expansion of transportation, power, and communication facilities. None of the Monument land will be exchanged and all forest lands will be maintained in that capacity. All lands capable of sustaining coniferous forest would be managed toward providing late-successional and old-growth habitat in all alternatives.
Forestry Program for Oregon – Timber Growth and Harvest	Promote the maximum level of sustainable timber growth and harvest on all forest lands available for timber production, consistent with applicable laws and regulations and taking into consideration landowner objectives.	All lands capable of sustaining coniferous forest would be managed toward providing late-successional and old-growth habitat in all alternatives. The objectives for forest lands in the CSNM is not for timber product but to provide habitat for late-successional and old-growth dependant species.

Table 5-1. Consistency of Proposed Action Alternatives with State of Oregon Plans

State Plan/Statute	Objective	Consistency of Alternatives
Forestry Program for Oregon – Recreation, Fish and Wildlife, Grazing, and other Forest Uses	Encourage appropriate opportunities for other forest uses, such as fish and wildlife habitat, grazing, recreation and scenic values on all forest lands, concistent with landowner objectives. A full range of recreational opportunities is encouraged. Where needed to reduce harassment and/or overharvest of wildlife, road closure programs are supported. Integration of sound grazing management practices compatible with timber management goals and wildlife habitat goals is encouraged	All alternatives provide opportunities for other forest uses. The priority objectives for management of forest lands in the Monument is for wildlife habitat and fish habitat. Indirect uses for recreation, grazing and collection of special forest products (i.e., mushrooms) is provided in most alternatives except Alternative D. Road closures in forest land base will be minimal as a result of reciprocal rights-of-way agreements with other landowners adjacent to the Monument. Grazing will continue in the short-term and will be re-evaluated in the future.
Forestry Program for Oregon – Forest Protection	Devise and use environmentally sound and economically efficient strategies to protect Oregon's forest from wildfire, insect, disease, and other damaging agents. Use integrated pest management. Employ cost-effective fire management policies that emphasize planned ignition fires over natural ignition fires and that consider impacts to the State's forest fire protection program.	Under all alternatives, economically efficient protection strategies would be employed while minimizing the disturbance to the landscape particularly in the Soda Mountain Wilderness Study Area (WSA) and the Research Natural Areas. The use of integrated pest management strategies is incorporated to varying degrees in the alternatives with Alternative D employing the most aggressive strategy. Alternatives C and D propose an aggressive fuel reduction strategy along the ridgeline separating the WSA from the northern portion of the Monument. Alternative C and D propose decommissioning roads in the southern portion of the Monument that may restrict access for fire suppression. Natural fire ignitions and prescribed natural fire will not be incorporated in any of the alternatives in this Plan

Table 5-1. Consistency of Proposed Action Alternatives with State of Oregon Plans

State Plan/Statute	Objective	Consistency of Alternatives
Statewide Planning Goals – Citizen Involvement	To develop a citizen involvement program that insures the opportunity for citizens to be involved in all phases of the planning process. Federal and other agencies shall coordinate their planning efforts with the affected government bodies and make use of existing local citizen involvement programs established by cities and counties.	BLM's land use planning process provides for public input at various stages. Public input was specifically requested in developing issues. Public input will continue to be utilized in development of the final RMP. Coordination with affected government agencies, including the ODF and ODF&W, has been ongoing and will continue. BLM has been working with Jackson County Commissioners to provide a linkage to their constituents.
Statewide Planning Goals – Land Use Planning	To establish a land use process and policy framework as a basis for all decisions related to use of land and to assure an adequate factual base for such decisions and actions.	All Alternatives in CSNM DRMP/DEIS have been developed in accordance with the land use planning process authorized by the Federal Land Policy and Management Act of 1976 which provides a policy framework for all decisions and actions. The process includes issue identification, inventories and evaluation of alternative choices.
Statewide Planning Goals – Agricultural Lands	To preserve and maintain existing commercial agricultural lands for farm, consistent with existing and future needs for agricultural products, forest, and open space.	None of the alternatives affect the use of lands for agricultural use.

Table 5-1. Consistency of Proposed Action Alternatives with State of Oregon Plans

State Plan/Statute	Objective	Consistency of Alternatives
Statewide Planning Goals – Open Spaces, Scenic and Historic Areas, and Natural Resources	To conserve open space and protect natural and scenic resources. Programs shall be provided that will (1) insure open space; (2) protect scenic and historic areas and natural resources for future generations, and (3) promote healthy and visually attractive environments in harmony with the natural landscape character. The location, quality and quantity of the following resources shall be inventoried: a) Land needed or desirable for open space; b) Mineral and aggregate resources; c) Energy sources; d) Fish and wildlife areas and habitats; e) Ecologically and scientifically significant natural area f) Outstanding scenic views and sites; g) Water areas, wetlands, watersheds, and ground water resources; h) Wilderness areas; i) Historic areas; j) Cultural areas; k) Potential and approved Oregon recreation trails; l) Potential and approval Federal wild and scenic waterways and state scenic waterways. Where no conflicting uses for such resources have been identified, such resources shall be managed to preserve their original character. Where conflicting uses have been identified, the economic, social, environmental, and energy consequences of the conflicting uses shall be determined and programs developed to achieve the goal.	Natural, historic and visual resources were considered in the development of the alternatives. The CSNM has been withdrawn from any forms of entry for mineral or resources. All alternatives in the CSNM prioritize the protection and maintenance of fish and wildlife habitat. Two ecologically and scientific significant Research natural Areas were identified and management plans written (Appendices DD and EE) common to all alternatives. The entire Monument viewshed is managed as VRM Class I or II and is common to all alternatives. Watersheds, wetlands, and streams were identified and many have been inventorial for proper functioning condition. The Soda Mountain Wilderness Study Area is identified in the Monument. Historic trails and significant cultural areas and sites have been identified and many have been inventoried. The Pacific Crest National Scenic Trail traverses the western border of the CSNM. There is no wild and scenic waterways identified in the CSNM. There are few conflicts in the Monument between preserving the resources or objects and uses in any of the alternatives. Access throughout the Monument is one of the only identified conflicts with priority in management toward limited access and more resource protection.

Table 5-1. Consistency of Proposed Action Alternatives with State of Oregon Plans

State Plan/Statute	Objective	Consistency of Alternatives
Statewide Planning Goals – Air, Water, and Land Resources Quality	To maintain and improve the quality if the air, water, and land resources of the state.	The Federal and state water quality standards would be met and water quality would be maintained and/or improved under all alternatives. See Chapter 4, Effects on water resources. Burning of vegetation slash under all alternatives would have a slight temporary effect on air quality at the upper atmospheric levels. All alternatives would comply with the statewide Smoke Management Plan and the State Implementation Plan. See Chapter 4, Effects on Air quality for discussion.
Statewide Planning Goals – Areas subject to Natural Disaster and hazards	To protect life and property from natural disaster and hazards.	Natural hazard areas, particularly floodplains, and areas with highly erosive soils have been identified. All alternatives provide for appropriate management of natural hazard areas. Bureau authorized development within natural areas would be minimal under all alternatives, with project construction engineering reflecting site-specific conditions and requirements.
Statewide Planning Goals – Recreational Needs	To satisfy the recreational needs of the citizens of the state and visitors and, where appropriate, to provide for the siting of necessary recreational facilities, including destination resorts. Federal agency recreation plans shall be coordinated with local and regional recreational needs and plans.	BLM actively coordinates its outdoor recreation and land use planning efforts with those of other agencies to establish integrated management objectives on a regional basis. Under all alternatives, opportunities would be provided to meet recreation demand providing they are consistent with protecting key Monument objects, resources or processes. None of the alternative would meet the demand for off highway vehicle use. The Hyatt Lake Recreational complex provides an array of recreational opportunities.

Table 5-1. Consistency of Proposed Action Alternatives with State of Oregon Plans

State Plan/Statute	Objective	Consistency of Alternatives
Statewide Planning Goals – Economy of the State	To diversify and improve the economy of the state.	None of the alternatives would contribute greatly to the economic stability of the region. Alternatives C and D would provide the highest potential for employment as many acres of vegetation manipulation, slash burning and road de-building would supply many job opportunities. Alternative B would provide limited economic opportunity as little intervention is prescribed.
Statewide Planning Goals – Public Facilities and Services	To plan and develop a timely, orderly, and efficient arrangement of public facilities and services to serve as a framework for urban and rural development	Alternative D provides for the construction of a public facility for a visitor center. No other accommodations toward providing public facilities and services to serve as a framework for urban and rural development are proposed.
Statewide Planning Goals – Transportation	To provide and encourage a safe, convenient and economical transportation system.	All alternatives provide for accommodation of transportation needs for access across the Monument. In alternative B, C, and D roads in the southern portion of the Monument would be closed and some decommissioned to enhance resource protection Decommissioning the roads would limit vehicle access to some of the Monument but does not inhibit valid existing rights.
Statewide Planning Goals – Energy Conservation	To conserve energy.	Conservation and efficient use of energy sources are objectives in all BLM activities. In alternatives C and D, firewood is made available but in limited amounts.

Local Government

The Oregon statewide planning program attached substantial importance to the coordination of federal plans with acknowledged local comprehensive plans. To the extent that BLM actions and programs are consistent with acknowledged county and city comprehensive plans and land use regulations, they can also be considered consistent with statewide planning goals. Local plans do not, however, address protection of Goal 5 values from the effects of forest management, as state law prohibits local government from regulating forest practices.

DEIS Distribution List and Availability on the Internet

This Draft Environmental Impact Statement (DEIS) is being made available to the following individuals, groups, and organizations. The list includes 11 elected officials; 21 federal agencies; 22 state and local governments; 7 American Indian Tribes and Nations; 3 libraries, 44 organizations; and approximately 300 individuals.

In addition, the Draft EIS will be available on the internet at http://www.or.blm.gov/csnm/.

Elected Officials

Oregon	*California*
U.S. Senator Gordon Smith	U.S. Senator Barbara Boxer
U. S. Senator Ron Wyden	U. S. Representative Wally Herger
U.S. Representative Greg Walden	State Senator Maurice Johannessen
U.S. Representative Peter DeFazio	State Assemblyman Dick Dickerson
Commissioner Sue Kupillas	Siskiyou County Supervisor Joan Smith
Coos County Commissioners	Siskiyou County Supervisor Kay Bryan

Federal Agencies

U.S. Department of Agriculture - U.S. Forest Service
Klamath National Forest
Applegate Ranger District
Ashland Ranger District
Rogue River National Forest
Goosenest Ranger District

U.S. Department of Energy - Bonneville Power Administration
Portland Office

U.S. Department of Energy - Federal Regulatory Commission
Regional Office in Portland

U.S. Department of Interior - Bureau of Land Management
Redding Field Office
Oregon State Office
Klamath Resource Area
California State Office

U.S. Department of Interior - U.S. Fish and Wildlife Service
Portland Office
Yreka Office

U.S. Department of Interior - Bureau of Reclamation
Portland Office
Boise Office

U.S. Department of Interior - Bureau of Indian Affairs
Portland Office

U.S. Environmental Protection Agency
Washington Office
Seattle Office
Portland Office

U.S. Department of Transportation - Federal Highway Administration
Portland Offices

U.S. Department of Commerce - National Marine Fisheries Serves
Portland Office

State and Local Government

Oregon

Oregon Department of Forestry
Oregon Department of Fish & Wildlife
Southern Oregon University
Oregon State University
University of Oregon
Oregon State Dept. of Transportation
Oregon Dept. of Environmental Quality
Oregon Natural Heritage Program
State Historic Preservation Officer
City of Ashland
Southern Oregon Extension Center
Jackson Co. Farm Bureau
Jackson County Soil and Water Conservation District

California

California Department of Forestry
California Department of Fish & Game
Siskiyou County Administrator
Siskiyou County APCD
Siskiyou County Planning Department
California Air Resources Board
University of California, Davis

Washington

Northwest Indian Fisheries Commission

Florida

University of Florida

Idaho

Idaho Department of Environmental Quality

Washington, DC

National Museum of Natural History

American Indian Tribes and Nations

Confederated Tribes of Siletz
Quartz Valley Indian Reservation (Shasta Tribes)
Shasta Nation
Confederated Bands [Shasta] Shasta Upper Klamath Indians
Confederated Tribes of the Rogue-Table Rock and Associated Tribes
Confederated Tribes of Grand Ronde
Klamath Tribes
Cow Creek Band of the Umpqua Indians

Libraries

Siskiyou County Library, Yreka Branch
Jackson County Library, Ashland Branch
Southern Oregon University Library, Ashland, Oregon

Businesses and Organizations

Headwaters
Motorcycle Riders Association
Blue Ribbon Coalition Inc.
Klamath Siskiyou Wildlands Center
Southern Oregon Timber Industry Assoc.
Pacific Power
Soda Mt. Wilderness Council
Colestine Rural Fire District
Southern Oregon Mountain Bike Association
Southern Oregon Research Extension Center
California Oregon Broadcasting, Inc.
Farm Service Agency
Siskiyou Resource Geographics
Jackson County Stockman Assoc.
Jackson County Farm Bureau
Jackson County Soil Water Conservation District
Soda Mountain Wilderness Council
Klamath Alliance for Resources & Environment
North Umpqua Back Country Horsemen
New Mexico Cattle Growers Association
Boise Cascade Corporation
Oregon Historic Trails Advisory Council
US West Communications
AT&T Wireless Services
California Oregon Broadcasting, Inc.
ARC-EN-CIEL
World Wildlife Fund
Pacific Crest Trail Assoc.
Siskiyou Project
Roxy Ann Gem & Mineral Inc.
World Wildlife Fund
PacifiCorp
Friends of the Greensprings
Klamath Herald and News
NFA
Cold Creek Ranch
Rogue Valley Audubon Society
American Lands Alliance
Wildlife Management. Institute
Hillcrest Corp
Oregon Natural Desert Association
KARE
Deixis Consultants
US Timberlands

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Glossary of Terms

AIR QUALITY: A measure of the health-related and visual characteristics of the air, often derived from quantitative measurements of the concentrations of specific injurious or contaminating substances.

AIR QUALITY CLASS I AND II AREAS: Regions in attainment areas where maintenance of existing good air quality is of high priority. Class I areas are those that have the most stringent degree of protection from future degradation of air quality. Class II areas permit moderate deterioration of existing air quality.

ALLOCATION: Process to specifically assign use between and ration among competing users for a particular area of public land or related waters.

ALLOTMENT: An area allocated for livestock use by one or more qualified grazing permittees including prescribed numbers and kinds of livestock under one plan of management.

ALLOTMENT MANAGEMENT PLAN (AMP): A written program of livestock grazing management including supportive measures, if required. An AMP is designed to attain specific management goals in a grazing allotment and is prepared cooperatively with the permittee(s) or lessee(s).

ALL-TERRAIN VEHICLE (ATV): All-terrain vehicle - 42" width or smaller. A small, amphibious motor vehicle with wheels or tractor treads for traveling over rough ground, snow, or ice, as well as on water.

ALTERNATIVE: One of at least two proposed means of accomplishing planning objectives.

ANALYSIS: The examination of existing and/or recommended management needs and their relationships to discover and display the outputs, benefits, effects, and consequences of initiating a proposed action.

ANIMAL UNIT MONTH (AUM): The amount of forage required to sustain the equivalent of 1 cow for 1 month; 1 wild horse for 1 month; or 5 sheep for 1 month; 8.9 deer for 1 month (winter season), 5.8 deer for 1 month (summer season); 9.6 antelope for 1 month; 5.5 bighorn sheep for 1 month; 2.2 burros for 1 month; 1.2 elk for 1 month (winter season) or 2.1 elk for 1 month (year-long) (usually 800 lbs. of useable air-dried forage).

ADMINISTRATIVE ACCESS: The authorization to enter or make use of a road or area by an employee, agent, or designated representative of the Federal Government, or one of its contractors, in the course of fulfilling official duties.

ASSESSMENT: A form of evaluation based on the standards of rangeland health, conducted by an interdisciplinary team at the appropriate landscape scale(pasture, allotment, sub-watershed, watershed, etc.) To determine conditions relative to standards.

AQUATIC: Living or growing in or on the water.

AQUIFER: Stratum or zone below the surface of the earth capable of producing water, as from a well. A saturated bed, formation, or group of formations which yield water in sufficient quantity to be of consequence as a source of supply. An aquifer acts as a transmission conduit and storage reservoir.

ARCHAEOLOGY: The scientific study of the life and culture of past, especially ancient, peoples, as by excavation of ancient cities, relics, artifacts, etc.

AREA OF CRITICAL ENVIRONMENTAL CONCERN (ACEC): An area of public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life/provide safety from natural hazards.

BOARD FOOT: A unit of measurement equal to an unfinished board foot square by one inch thick.

BIODIVERSITY: The variety of life and its processes, and the interrelationships within and among various levels of ecological organization. Conservation, protection, and restoration of biological species and genetic diversity are needed to sustain the health of existing biological systems. Federal resource management agencies must examine the implications of management actions and development decisions on regional and local biodiversity.

BRYOPHYTES: Plants of the phylum Bryophyta, including mosses, liverworts, and hornworts, characterized by the lack of true roots, stems and leaves.

CANDIDATE SPECIES: Those plants and animals included in the Federal Register "Notices of Review" that are being considered by the U.S. Fish and Wildlife Service for listing as threatened or endangered. Two categories that are of primary concern: Category 1 - Taxa for which there is substantial information to support proposing the species for listing as threatened or endangered. Listing proposals are either being prepared or have been delayed by higher priority listing work. Category 2 - Taxa information indicates that listing is possibly appropriate. Additional information is being collected.

COMMERCIAL THINNING: The removal of generally merchantable trees from an even-aged stand, usually to encourage growth of the remaining trees.

COMPACTION LAYER: A layer within the soil profile in which the soil particles have been rearranged to decrease void space, thereby increasing soil bulk density and often reducing permeability.

CONNECTIVITY: A measure of the extent to which conditions among late-successional/old-growth (LS/OG) forest areas provide habitat for breeding, feeding, dispersal, and movement of LS/OG associated wildlife and fish species.

CONSULTATION: Formal consultation is a process that occurs between the U.S. Fish and Wildlife Service(USFWS) or the National Marine Fisheries Service(NMFS) and a federal agency that commences with the federal agency's written request for consultation under Section 7(a)(2) of the Endangered Species Act regarding a federal action which may affect a listed species or its critical habitat. It concludes with the issuance of the biological opinion under Section 7(b)(3) of the Act. Informal consultation is an optional process that includes all discussions, correspondence, etc., between the USFWS or NMFS and the federal agency, or the designated non-federal representative, prior to formal consultation, if required. If the listing agency determines that there is no likely adverse affect to the listed species, it may concur with the action agency that formal consultation is unnecessary.

CUBIC FEET PER SECOND (cfs): As a rate of stream flow, a cubic foot of water passing a referenced section in 1 second of time. One cfs flowing for 24 hours will yield 1.983 acre-feet of water.

CULTURAL RESOURCES: Those resources of historical and archaeological significance.

CUMULATIVE EFFECTS: Those effects on the environment that result from the incremental effect of the action when added to past, present, and reasonably foreseeable future actions regardless of what agency or person(s) undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

DECOMMISSION: To remove those elements of a road that reroute hillslope drainage and present slope stability hazards. This usually involves removing the culverts, ripping the road prism, installing drainage facilities (i.e. waterbars, waterdips, etc.), and replanting the road surface with grasses, legumes, shrubs, and trees.

DEGREE OF FUNCTION: A level of physical function relative to properly functioning condition commonly expressed as: properly functioning, functioning-at-risk, or non-functional.

DESIGNATED ROAD: A linear "transportation facility" on which state-licensed, four wheeled vehicles can travel. By definition, these do not qualify as trails.

DIRT BIKE: Non-street legal motorcycle.

DISPERSAL HABITAT: Habitat that supports the life needs of an individual animal during dispersal. Generally satisfies needs for foraging, roosting, and protection from predators.

DIVERSITY: The aggregate of species assemblages (communities), individual species, and the genetic variation within species and the processes by which these components interact within and among themselves. The elements of diversity are: 1. Community diversity (habitat, ecosystem), 2. Species diversity and 3. Genetic diversity within a species; all three of which change over time.

EASEMENT: A right or privilege one may have on another's land.

ECOSYSTEM: A system made up of a community of animals, plants, and micro-organisms and its interrelated physical and chemical environment.

ECOTONE: A zone of intergradation between ecological communities.

ENDANGERED SPECIES: Any animal or plant species in danger of extinction throughout all of a significant portion of its range. These species are listed by the U. S. Fish and Wildlife Service.

ENDEMIC: A species that is unique to a specific locality.

ENERGY FLOW: The process in which solar energy is converted to chemical energy through photosynthesis and passed through the food chain until it is eventually dispersed through respiration and decomposition.

ENDOGENOUS DISTURBANCE: Disturbance that originates from within the ecosystem.

ENVIRONMENTAL JUSTICE: The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development , implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including racial, ethnic, or socioeconomic group should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies.

EPHEMERAL STREAM: A stream that flows only in direct response to precipitation, and whose channel is at all times above the water table.

EQUESTRIAN: Of horses, horsemen, or horseback riding.

FACILITY: Refers to administrative or recreational areas/structures installed and operated by the Bureau of Land Management. Areas include campgrounds, trailheads, pullouts, picnic areas, and parking areas. Structures include buildings, shelters, hiking trails, kiosks, signs, toilets, picnic tables, fire rings, water hydrants, and fences.

FAUNA: The animals of a specified region or time.

FLOODPLAIN: A plain along a stream or river onto which the flow spreads at flood stage.

FLORA: The plants of a specified region or time.

FORAGE: Vegetation of all forms available and of a type used for animal consumption.

FORMATION: The primary unit in stratigraphy consisting of a succession of strata useful for mapping or description. Most formations possess certain lithologic features that may indicate genetic relationships.

FOSSIL: The remains or traces of animals or plants which have been preserved by natural causes in the earth's crust exclusive of organisms which have been buried since the beginning of historic times.

FOUR-WHEEL-DRIVE (4WD): Four-wheel-drive, differential transfer case disperses 50/50 front and rear displacement. Trucks, cars, buses, or sport utility vehicles with high clearance and the ability to operate off-pavement as well as on highways.

FUNCTIONING-AT-RISK: Riparian-wetland areas that are in functional condition but an existing soil, water, or vegetation attribute makes them susceptible to degradation.

GEOLOGY: The science which studies the Earth, the rocks of which it is composed, and the changes it has undergone or is undergoing.

GRAZING PERMIT: An authorization which allows grazing on public lands. Permits specify class of livestock on a designated area during specified seasons each year. Permits are of two types: preference (10 year) and temporary nonrenewable (1 year).

GRAZING PREFERENCE: The total number (active and suspended non-use) of animal unit months of livestock grazing on public land apportioned and attached to base property owned or controlled by a permittee.

GROUND WATER: Water in the ground that is in the zone of saturation; water in the ground that exists at, or below the water table.

GUIDELINE: Practices, methods, techniques and considerations used to ensure that progress is made in a way and at a rate that achieves the standard(s).

GULLY: A channel resulting from erosion and caused by the concentrated but intermittent flow of water usually during and immediately following heavy rains.

HABITAT: A specific set of physical conditions in a geographic area(s) that surrounds a single species, a group of species, or a large community. In wildlife management, the major components of habitat are food, water, cover, and living space.

HABITAT FRAGMENTATION: The breakup of extensive habitats into small, isolated patches that are too limited to maintain their species stocks into the indefinite future.

HABITAT TYPES: The BLM modified the McKelvie system by dividing two of his habitat types for a total of six types instead of four. A definition of each category can be found in Chapter 2, in the Wildlife section.

HEADWATER CAPTURING: Extensive flooding at the end of an ice age which may have allowed native populations in some headwater streams to transfer to others.

HYDROLOGIC CYCLE: The process in which water enters the atmosphere through evaporation, transpiration, or sublimation from the oceans, other surface water bodies, or from the land and vegetation, and through condensation and precipitation returns to the earth's surface. The precipitation then occurring as overland flow, stream flow, or percolating underground flow to the oceans or other surface water bodies or to other sites of evapo-transpiration and recirculation.

HYDROLOGY: The science dealing with the properties, distribution, and circulation of water.

IMPACT: Synonymous with effects. Includes ecological, aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Impacts may also include those resulting from actions which may have both beneficial and detrimental (adverse) effects. Impacts may be considered as direct, indirect, or cumulative:

- Direct: Impacts caused by an action an occurring at the same time and place.
- Indirect: Impacts caused by the proposed action and occurring later in time or farther removed in distance, but are still reasonably foreseeable.
- Cumulative: Those which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions.

INDICATORS: Parameters of ecosystem function that are observed, assessed, measured, or monitored directly or indirectly determine attainment of a standard(s).

INFILTRATION: The downward entry of water into the soil.

INFILTRATION RATE: The rate at which water enters the soil.

INGROWTH: Ingrowth occurs when trees pass some arbitrary minimum growth diameter and are counted for the first time. Their contribution to (stand) growth can then be measured or assessed. In an unbalanced stand the magnitude of ingrowth of small trees can be large in influence and can fluctuate markedly over time. Within the context of this publication ingrowth generally refers to white fir and other species that have seeded in and grown since the last major disturbance event, usually fire.

INHOLDING: A non-federal parcel of land that is completely surrounded by federal land. Lands not owned by the United States Government within the boundary of the

Cascade-Siskiyou National Monument as designated by the Presidential Proclamation dated June 9, 2000.

INTERIM MANAGEMENT POLICY (IMP): An interim measure governing lands under wilderness review. This policy protects Wilderness Study Areas from impairment of their suitability as wilderness.

INTERMITTENT STREAM: Seasonal stream. A stream that flows only at certain times of the year when it receives water from springs or from some surface source, such as melting snow in mountainous areas.

INVERTEBRATE SPECIES: Any animal without a backbone or spinal column.

KEY WATERSHED: As defined by National Forest and Bureau of Land Management District fish biologists, a watershed containing (1) habitat for potentially threatened species of stocks of anadromous salmonids or other potentially threatened fish, or (2) greater than six square miles with high quality water and fish habitat.

KIND OR CLASS OF LIVESTOCK:

- Kind: The species of domestic livestock- cattle and sheep.
- Class: The age class (i.e., yearling or cows) of a species of livestock.

LAND USE PLAN: A plan that reflects an analysis of activity systems and a carefully studied estimate of future land requirements for expansion, growth control, and revitalization or renewal. The plan shows how development in the area should proceed in the future to insure the best possible physical environment for living, the most economic and environmentally sensitive use of land, and the proper balance in use. The land use plan embodies a proposal as to how land should be used in the future, recognizing local objectives and generally accepted principals of health, safety, convenience, economy, and general living amenities.

LATE-SUCCESSIONAL FOREST: Forest seral stages which include mature and old-growth age class.

LEASE: An authorization by which one party (lessor) conveys the use of property, such as real estate, to another (lessee) in return for rental payments.

LEASABLE MINERAL: A mineral such as coal, oil shale, oil and gas, phosphate, potash, sodium, geothermal resources, and all other minerals that may be developed under the Mineral Leasing Act of 1920, as amended.

LEAVE NO TRACE: A land use ethic which involves many aspects to help eliminate or reduce impacts. It starts with proper planning to avoid high use periods, to repack food to avoid unnecessary packaging and waste. It includes traveling on existing trails and using existing campsites if available, and if not camp in an area that is durable. Leave no trace promotes the proper methods to dispose of wastes, and use of stoves and candle lanterns for cooking and light rather than campfires. If a campfire is used, do not create new ones but use existing fire rings. Keep fires small and scatter the ashes when breaking camp. Camp at least 200 feet from streams and lakes, respect wildlife and other visitors by staying as inconspicuous as possible.

LOCATABLE MINERAL: Any valuable mineral that is not saleable or leasable including gold, silver, copper, uranium, etc., that may be developed under the General Mining Law of 1872.

MINERAL ENTRY: The location of mining claims by an individual to protect his/her right to a valuable mineral.

MINERAL MATERIALS: Refer to saleable minerals.

MINERAL POTENTIAL:
- High: Those lands currently producing locatable or leaseable minerals or having high current industry interest.
- Moderate: Those lands which have had locatable or leaseable minerals in favorable geologic environments.
- Low: Those lands where either the geologic environment appears to be favorable for the accumulation of locatable or leaseable minerals, or where little or no information is available to evaluate the mineral potential.

MINERAL WITHDRAWAL: A withdrawal of public lands which are potentially valuable for leasable minerals. This precludes the disposal of the lands except with a mineral reservation, unless the lands are found to not be valuable for minerals.

MITIGATING MEASURES: Constraints, requirements, or conditions imposed to reduce the significance of or eliminate an anticipated impact to environmental, socioeconomic, or other resource value from a proposed land use. Committed mitigating measures are those measures BLM is committed to enforce (i.e., all applicable laws and their implementing regulations).

MONITORING: A process of collecting information to evaluate if objective and anticipated or assumed results of a management activity or plan are being realized or if implementation is proceeding as planned.

MONTMORILLONITIC CLAY: Soils with aluminum/silicate clays with an expanding crystal lattice. Montmorillonitic clays have a high shrink/swell ratio which results in large cracks in the soil when it is dry and swelling upon wetting. These soils are, generally, very sticky and slippery when wet.

MOUNTAIN BICYCLE: Bicycle designed for off-pavement use. Generally are multi-geared with fat knobby tires. Frames and tire rims are stronger than road bicycles. Sometimes referred to in this document as a non-motorized vehicle.

NATURALNESS: An area which "generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable." (Section 2c, WILDERNESS ACT).

NON-FUNCTIONING: Riparian-wetland areas that clearly are not providing adequate vegetation, landform, or large woody debris to dissipate stream energy associated with high flows.

NOXIOUS WEEDS: Those plants which are injurious to public health, agriculture, recreation, wildlife, or any public or private property.

NUTRIENT CYCLING: The movement of essential elements and inorganic compounds between the reservoir pool (soil, for example) and the cycling pool (organisms) in the rapid exchange (i.e., moving back and forth) between organisms and their immediate environment.

OFF-HIGHWAY VEHICLES (OHV): Any motorized vehicle designed for or capable of cross-country travel over lands, water, sand, snow, ice, marsh, swamp-land, or other terrain.

OFF-HIGHWAY VEHICLE DESIGNATIONS:

- Open: Designated areas where OHVs may be operated.
- Limited: Designated areas and trails where the use of an OHV is subject to restrictions, such as limiting the dates and times of use (seasonal restrictions); limiting use to designated roads and trails; limiting use to existing roads and trails. Combinations of restrictions are possible.
- Closed: Designated areas, roads, and trails where the use of an OHV is permanently or temporarily prohibited. Emergency use of vehicles is allowed.

OFF ROAD: see off-highway vehicles (above).

OLD-GROWTH FOREST: A conifer forest stand usually at least 180-220 years old with moderate to high canopy closure; a multi-layered, multi-species canopy dominated by large overstory trees; high incidence of large trees, some with broken tops and other indications of old and decaying wood (decadence); numerous large snags; and heavy accumulations of wood, including large logs on the ground.

ORGANIC MATTER: Plant and animal residues accumulated or deposited at the soil surface; the organic fraction of the soil that includes plant and animal residues at various stages of decomposition; cells and tissues of soil organisms, and the substances synthesized by the soil population.

OUTSTANDING: Standing out among others of its kind; distinguished; excellent.

PALEONTOLOGY: The branch of geology that deals with life forms from the past, especially prehistoric life forms, through the study of plant and animal fossils.

PERCHED WATER TABLE: Water table above an impermeable bed underlain by unsaturated rocks of sufficient permeability to allow movement of ground water.

PERENNIAL STREAM: A stream that flows continuously. Perennial streams are generally associated with a water table in the localities through which they flow.

PERMIT: A short-term, revocable authorization to use public lands for specific purposes.

PERMITTEE: (Livestock Operator) A person or organization legally permitted to graze a specific number and class of livestock on designated areas of public land during specified seasons each year.

PERMEABILITY: The ease with which gases, liquids or plant roots penetrate or pass through bulk mass of soil or a layer of soil.

PETRIFIED WOOD: Fossilization of wood through introduction or replacement by silica (silicified wood) in such a manner that the original form and structure of the wood is preserved.

PHYSIOGRAPHIC REGION: Region of similar geologic structure and climate with a unified history of land formation.

PRESCRIBED FIRE: Controlled application of fire to natural fuels under conditions of weather, fuel moisture, and soil moisture that will allow confinement of the fire to a predetermined area and, at the same time, will produce the intensity of heat and rate of spread required to accomplish certain planned benefits to one or more objectives to wildlife, livestock, and watershed values. The overall objectives are to employ fire scientifically to realize maximum net benefits at minimum environmental damage and acceptable cost.

PREY SPECIES: An animal taken by a predator as food.

PRIMARY RECREATION AREAS: Includes selected portions of major travel routes, established recreation areas, and access points to popular hiking and sightseeing destinations which are considered to be compatible with concentrated recreation use.

PROBABLE SALE QUANTITY (PSQ): Probable sale quantity is the gross amount of timber volume, including salvage, that may be sold annually from a specified area over a stated period in accordance with management plans of the BLM. PSQ includes only scheduled or regulated yields from Matrix land and does not include "other wood" such as that taken from the LSR.

PROPER GRAZING USE: Grazing that, through the control of timing, frequency, intensity and duration of use, meets the physiological needs of the desirable vegetation, provides for the establishment of desirable plants and is in accord with the physical function and stability of soil and landform (properly functioning condition).

PROPERLY FUNCTIONING CONDITION (PFC): Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality; filter sediment; capture bedload, and aid floodplain development; improve flood-water retention and ground-water recharge; develop root masses that stabilize streambanks against cutting action; develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and support greater biodiversity.

RANGELAND IMPROVEMENTS: Any activity or program on or relating to rangelands that is designed to improve forage production, change vegetation composition, control patterns of use, provide water, stabilize soil and water conditions, and enhance habitat for livestock, wildlife, and wild horses and burros. Rangeland improvements include land treatments (e.g., chaining, seeding, burning, etc.), stockwater developments, fences, and trails.

RAPTORS: Birds of prey, such as the eagle, falcon, hawk, owl, or vulture.

REASONABLE ACCESS: Owners of non-federal land surrounded by public land managed under FLPMA are entitled to reasonable access to their land. Reasonable access is defined as access that the Secretary of the Interior deems adequate to secure the owner reasonable use and enjoyment of the non-federal land. Such access is subject to rules and regulations governing the administration of public land.

REFERENCE AREA: Sites that, because of their condition and degree of function, represent the ecological potential or capability of similar sites in an area of region (ecological province); serve as a benchmark in determining the ecological potential of sites with similar soil, climatic, and landscape characteristics.

RELICT PLANT COMMUNITY: Areas of plants that have persisted despite the pronounced warming and drying of the interior west over the last few thousand years and/or have not been influenced by settlement and post-settlement activities.

RESEARCH NATURAL AREA (RNA): An area set aside by a public or private agency specifically to preserve a representative sample of an ecological community, primarily for scientific and educational purposes. RNAs are areas designated to ensure representative samples of as many of the major naturally occurring plant communities as possible are preserved. The public may be excluded or restricted from such areas to protect studies.

RIGHT-OF-WAY: Federal land authorized to be used or occupied for the construction, operation, maintenance, and termination of a project, pursuant to a R-O-W authorization.

RILL: A small, intermittent water course with steep sides; usually only a few inches deep.

RIPARIAN HABITAT: Riparian habitat is defined as an area of land directly influenced by permanent (surface or subsurface) water. They have visible vegetation or physical characteristics reflective of permanent water influence. Lake shores and stream-banks are typical riparian areas. Excluded are such sites as ephemeral streams or washes that do not exhibit the presence of vegetation dependent upon free water in the soil.

RIPARIAN AREA: A geographic area containing an aquatic ecosystem and adjacent upland areas that directly affect it. This includes floodplain, woodlands, and all areas within a horizontal distance of approximately 100 feet from the normal line of high water of a stream channel or from the shoreline of a standing body of water.

RIPARIAN VEGETATION: Plants adapted to moist growing conditions along streams, waterways, ponds, etc.

ROAD: A created or evolved "transportation facility" administratively designated for certain mechanized and non-mechanized types of use. Examples of use on roads are highway vehicles, off-highway vehicles, snowmobiles, equestrian, and hiking.

ROUTE: A path, way, trail, road, or other established travel corridor.

SALEABLE MINERALS: Minerals that may be sold under the Material Sale Act of 1947, as amended. Included are common varieties of sand, stone, gravel, and clay.

SEASON-OF-USE: The timing of livestock grazing on a rangeland area.

SEDIMENT YIELD: The quantity of soil, rock particles, organic matter, or other dissolved or suspended debris is transported through a cross-section of stream in a given period. Measured in dry weight or by volume.

SENSITIVE SPECIES: Those species that (1) have appeared in the Federal Register as proposed for classification and are under consideration for official listing as endangered or threatened species or (2) are on an official state list or (3) are recognized by the BLM as needing special management to prevent their being placed on Federal or state lists.

SERAL STAGES: The series of relatively transitory plant communities that develop during ecological succession from bare ground to climax stage.

- early seral:Plant communities in the early stage of succession after disturbance that are dominated by colonizers that have high rates of invasion and survival. Plant species are generally short lived, rapid growing pioneers that occupy the site quickly after disturbance and tend to be intolerant. In this document this often means young forest plantations

- mid seral: Plant communities in a transitional state of progression toward a climax sere. In this document this often refers to conifer forests 60 - 80 years of age.

- late seral: Climax sere in which species remain on site long-term and are able to reproduce under their own canopy or in gaps created by death of older individuals. Often referred to in this document to describe late-successional conifer forests exceeding 120 years of age. Plant community composition tends to be relatively stable.

SERE: The entire sequence of ecological communities successively occupying an area.

SIGNIFICANT PROGRESS: When used in reference to achieving a standard: (actions), the necessary land treatments, practices and/or changes to management have been applied or are in effect, (rate) a rate of progress that is consistent with the anticipated recovery rate described in plan objectives, with due recognition of the effects of climatic extremes (drought, flooding, etc.), fire, and other unforseen naturally occurring events or disturbances.

SILVICULTURAL SYSTEM: A planned sequence of treatments or prescriptions over the entire life of a forest stand needed to meet management objectives.

SLASHBUSTER: An excavator with high speed rotating blades on the end of its mast. These blades shred woody material into small diameter pieces of less than one inch.

SOIL DENSITY (bulk density): The mass of dry soil per unit bulk volume.

SOIL MOISTURE: Water contained in the soil; commonly used to describe water in the soil above the water table.

SPECIAL STATUS SPECIES: Wildlife and plant species either Federally listed or proposed for listing as endangered or threatened; state-listed or BLM determined priority species.

SPECIES OF LOCAL IMPORTANCE: Species of significant importance to Native American populations (e.g., medicinal and food plants).

SUB-WATERSHED: The sixth level in the hydrologic unit hierarchy. A subwatershed is a subdivision within a fifth level watershed.

SUSPENDED: Term used when describing an administrative state of mining operations or oil, gas, and mineral leases, whereby the operation or lease is "suspended" or on standby while an administrative action is contemplated. When mineral leases are suspended, the lessee cannot explore, develop, or otherwise enjoy the benefits of the lease. Also, the term (time period) of the lease is suspended.

TECHNICAL ROCK CLIMBING: Type of rock climbing were special equipment is necesssary to ascend and descend along the rock face. As used in this document, the use of ropes and protective anchor points, both fixed and temporary, to climb Pilot Rock is considered "Technical Rock Climbing". The Scramble Route (level 4) on the north side of Pilot Rock is considered "non-technical".

THREATENED SPECIES: Any animal or plant species likely to become endangered within the foreseeable future throughout all of a significant portion of its range. These species are listed by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service in accordance with the 1973 Endangered Species Act and published in the Federal Register.

TIMBER MANAGEMENT: A general term for the directing, managing or controlling of forest crops and stand of trees.

TIMBER PRODUCTION: The purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts, or other round sections for industrial or consumer use other than for fuelwood.

TOPOGRAPHY: The accurate and detailed description of a place.

TOTAL DISSOLVED SOLIDS (TDS): The total quantity (reported in milligrams per liter) of dissolved materials in water.

TRAIL: A created or evolved "transportation facility" administratively designated for certain non-mechanized types of use. Examples of use on the trails in the Monument include hiking, equestrian and cross country skiing.

TRAILHEAD: A designated point of access to a recreation route or trail. It may include a parking area, kiosk, or toilet and can be reached by vehicular or pedestrian access.

TREND IN RANGE CONDITION: An interpretation of the direction of change in range condition. These determinations may relate to ecological site or forage conditions. Also vegetation trend that is improving (upward) not changing (static) and declining (downward).

TWO-WHEEL-DRIVE (2WD): Vehicle clearance generally lower than with a 4WD. Not designed to travel off-pavement.

UPLANDS: Lands that exist above the riparian/wetland area, or active flood plains of rivers and streams; those lands not influenced by the water table or by free or unbound water; commonly represented by the toe slopes, alluvial fans, side slopes, shoulders and ridges of mountain and hills.

UTILITY: A service provided by a public utility, such as electricity, telephone, or water.

VALID EXISTING RIGHTS: Those rights in existence within the boundaries of the Cascade Siskiyou National Monument before the Monument was established on June 9, 2000. Valid existing rights were established by various laws, leases, and filings made with the BLM.

VEGETATION RESTORATION METHODS: Mechanical, chemical, biological, and fire vegetation treatments used to restore and promote a natural range of native plant associations. Treatments are designed for specific areas and differ according to the area's suitability and potential. The most common land treatment methods alter the vegetation by spraying with pesticides, burning, or plowing, followed by seeding with native plant species.

VERTEBRATE SPECIES: Any animal with a backbone or spinal column.

VISITOR DAY: Twelve visitor hours which may be aggregated by one or more persons in single or multiple visits.

VISITOR USE: Visitor use of a resource for inspiration, stimulation, solitude, relaxation, education, pleasure, or satisfaction.

VISUAL RESOURCE MANAGEMENT (VRM) CLASSES: Management classes are determined on the basis of overall scenic quality, distance from travel routes, and sensitivity to change.

Class I: Provides primarily for natural ecological changes only. It is applied to wilderness areas, some natural areas, and similar situations where management activities are to be restricted.

Class II: Changes in the basic elements caused by a management activity may be evident in the characteristic landscape, but the changes should remain subordinate to the visual strength of the existing character.

Class III: Changes in the basic elements caused by a management activity may be evident in the characteristic landscape, but the changes should remain subordinate to the visual strength of the existing character.

Class IV: Changes may subordinate the original composition and character but must reflect what could be a natural occurrence within the characteristic landscape.

WATERSHED: All land and water within the confines of a drainage divide.

WATERSHED ANALYSIS: A systematic procedure for characterizing watershed and ecological processes to meet specific management and social objectives. Watershed analysis provides a basis for ecosystem management planning.

WATERSHED FUNCTION: The principle functions of a watershed include the capture of moisture contributed by precipitation; the storage of moisture within the soil profile, and the release of moisture through subsurface flow, deep percolation to groundwater, evaporation from the soil, and transpiration by live vegetation.

WAY: A path, trail, or other established travel corridor.

WETLANDS: Lands including swamps, marshes, bogs, and similar areas, such as wet meadows, river overflows, mud flats, and natural ponds.

WILDERNESS AREA: Areas designated by congressional action under the 1964 Wilderness Act. Wilderness is defined as undeveloped Federal land retaining its primeval character and influence without permanent improvements or human habitation. Wilderness areas are protected and managed to preserve their natural conditions, which generally appear to have been affected primarily by the forces of nature with the imprint on human activity substantially unnoticeable; have outstanding opportunities for solitude or for a primitive and confined type of recreation; include at least 5,000 acres or are of sufficient size to make practical their preservation, enjoyment, and use in an unimpaired condition; and may contain features of scientific, education, scenic, or historical value as well as ecological and geological interest.

WILDERNESS STUDY AREA (WSA): Areas under study for possible inclusion as a Wilderness Area in the National Wilderness Preservation System.

WILDFIRE: Any wildland fire that does not meet management objectives, thus requiring a fire suppression response. Once declared a wildfire, the fire can no longer be declared a prescribed fire.

WINDTHROW: A tree or trees uprooted or felled by the wind.

WITHDRAWAL: Removal or "withholding" of public lands from operation of some or all of the public land laws (settlement, sale, mining, and/or mineral leasing). An action which restricts the use or disposal of public lands, segregating the land from the operation of some or all of the public land and/or mineral laws and holding it for a specific public purpose. Withdrawals may also be used to transfer jurisdiction of management to other Federal agencies.

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